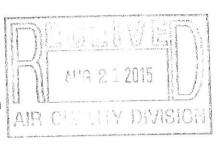


August 20, 2015

Ms. Alicia Boltz Air Quality Engineer Wyoming Dept. of Environmental Quality – Air Quality Division 122 W. 25th Street Chevenne, WY 82002



Re: Response to Incompleteness Letter

Application A0000942 Stud Horse Butte 13-26 Central Facility

Jonah Energy LLC

Dear Ms. Boltz.

Under cover dated April 29, 2015, Jonah Energy LLC (Jonah) submitted a Chapter 6, Section 2 air quality permit application to the Wyoming Department of Environmental Quality - Air Quality Division (WDEQ) for the request to install and operate one (1) natural gas-fired compressor engine with a maximum horsepower (hp) of 1,850 hp and two (2) 1.0 MMBtu/hr separator heaters. The WDEQ confirmed receipt of the permit application on May 6, 2015, and assigned Application Number A0000942 to the Stud Horse Butte 13-26 (SHB 13-26) compressor engine application.

On May 18, 2015, the WDEQ issued an Incomplete Application determination on the SHB 13-26 compressor engine application, requesting additional release point information be provided on the IMPACT application forms, along with the request to submit AERMOD modeling for the project.

Since the receipt of the May 18, 2015 letter from the WDEQ, Jonah has finalized the line pressure reduction project compression requirements at the SHB 13-26 production facility, resulting in the requirement to install two (2) compressor engines instead of one (1) compressor engine.

Therefore, on behalf of Jonah, SLR International Corporation (SLR) is pleased to provide the attached AERMOD dispersion modeling, updated emissions calculations, and IMPACT application forms in response to the incompleteness determination dated May 18, 2015 for Jonah's Stud Horse Butte 13-26 (SHB 13-26) Central Facility.

August 20, 2015 Ms. Alicia Boltz SHB 13-26 Application No. A0000942 Page 2

SLR conducted the AERMOD dispersion modeling in accordance with our discussions with Mr. Nathan Henschel and Mr. Josh Nall and following applicable WDEQ minor source modeling guidance. A description of the modeling inputs, methodology and results is provided in **Attachment A**. Detailed emissions calculations for the compressor engines and heaters along with vendor sheets are provided as **Attachment B**. The applicable IMPACT application forms are provided as **Attachment C** and **Attachment D** contains the electronic modeling input/output files along with a pdf version of this letter response and associated attachments.

We are assuming that you will make sure the modeling I/O files and supporting information are provided to Mr. Nathan Henschel for his review. If you have any questions regarding the emissions calculations and/or IMPACT forms please do not hesitate to contact Chuck Cornell of Jonah at (720) 577-1251 or me at (970) 999-3969. Any questions regarding the modeling please have Mr. Henschel contact Jason Reed of SLR at (970) 999-3970.

We trust this information will be sufficient for the Division to deem the permit application complete, and we thank you in advance for your prompt review of this most important application.

Sincerely,

SLR International Corporation

AMIE CHRISTOPHER

Jamie Christopher Principal Engineer

jchristopher@slrconsulting.com

JC/ Enc.





ATTACHMENT A - Modeling Methodology and Results



MODELING METHODOLOGY AND INPUTS

SLR conducted air dispersion modeling for the proposed modification of the SHB 13-26 central facility using the latest version of the AERMOD modeling system including:

- AERMAP version 11103:
- AERSURFACE version 13016:
- AERMET version 15181; and
- AERMOD version 15181.

The meteorological data used in the analysis was the 2010-2014 Juel Spring surface meteorological data and Riverton upper air data¹. The Juel Spring data include horizontal wind speed and direction, ambient temperature, 10-2 meter temperature difference, and total solar radiation. Horizontal wind direction standard deviation (sigma-theta) is also calculated at the Juel Spring site; however, based on direction received from the WDEQ², the sigma-theta data were not used.

The 2011 National Land Cover Dataset (NLCD) was used to obtain geophysical parameters, in twelve 30° sectors, for the area centered around the Juel Spring tower location. The selection of seasons for each month was based on WDEQ guidance^{3,4}, which assumes default seasons except for winter in which an analysis of snow cover was conducted. If a month had greater than 50% of the days with a snow depth of more than 1", it was classified as winter with snow; otherwise it was classified as winter with no snow. The snow cover and precipitation data from the nearby Boulder Rearing Station was used to perform this classification as well as the moisture levels of dry, average or wet based on EPA guidance⁵.

Receptors were generated following the WDEQ guidance and elevations were obtained using AERMAP and elevation data from the National Elevation Dataset (NED). All preprocessing files for AERSURFACE, AERMET and AERMAP are provided in the attached CD (Attachment D).

⁵ AERSURFACE User's Guide Revised 01/16/2013. Each month's precipitation (2010-2014) was compared to the period of record average monthly precipitation to determine if that month was dry, average or wet.



¹ The Juel Spring surface data was provided by WDEQ to SLR by email on May 20, 2015. The upper air data was obtained from the NOAA FSL database: http://esrl.noaa.gov/raobs/.

 $^{^{2}}$ E-mail from Josh Nall on July 20, 2015 recommending that Juel Spring sigma-theta data not be used in the AERMET processing.

³ WDEQ-AQD Minor Source Modeling Guidance, September 2014.

⁴ This was provided by WDEQ to SLR by email on May 20, 2015.

AERMOD MODELING AND RESULTS

Dispersion modeling for SHB 13-26 was performed for annual NO_2 and formaldehyde impacts following discussions with WDEQ. The model was run in default mode to determine the maximum annual impacts for each year in the five-year modeling period. The ambient ratio method (75% conversion of modeled NO_X -to- NO_2) was applied to the maximum annual NO_X concentrations for comparison to the Wyoming Ambient Air Quality Standards (WAAQS) and Class II increment. The emissions and stack parameters for the two (2) compressor engines and two (2) heaters are provided in **Attachment B**. The compressor engine stack heights are sufficient to meet the WDEQ minor source modeling requirement that the engine stack heights must be at least 1.5 x higher than the compressor building height. In this case, the engine stack heights are 1.5 x 17.5'; or 26.25' above ground level.

Due to the close proximity (approximately 3.5 km) from another proposed Jonah Energy project (SHB 1-29), both SHB 13-26 and 1-29 were included in the modeling to address potential source overlap. In addition, WDEQ provided an off-site inventory for NO₂ and formaldehyde to assess cumulative impacts⁶. The offsite inventories were used as-provided with the exception of the modification of some sources with zero base elevations, one source with incorrect coordinates and the removal of an emergency generator per WDEQ's request⁷.

The modeling results for NO_x and formaldehyde are summarized below in **Tables 1 and 2**, respectively. The modeling demonstrates that the maximum SHB 13-26 impacts are above the Class II NO_2 significant impact level, but are only 15% of the annual NO_2 WAAQS and 51% of the Class II NO_2 increment. The results also demonstrate that there is little overlap between impacts from SHB 13-26 and any other nearby sources including SHB 1-29. The SHB 13-26 maximum formaldehyde cancer risk at any receptor is calculated to be 9 per million using the conservative WDEQ methodology⁸. The cumulative formaldehyde cancer risk is calculated to be 9.1 per million, which indicates very little overlap between impacts from SHB13-26 and other nearby sources including SHB 1-29. The AERMOD input and output files for both NO_x and formaldehyde are provided in the CD included as **Attachment D**.



⁶ The offsite inventories were provided by WDEQ to SLR by email on May 20, 2015.

⁷ Email communication between Nathan Henschel (WDEQ) and Jason Reed (SLR).

⁸ WDEQ-AQD Minor Source Modeling Guidance, September 2014.

Table 1: SHB 13-26 Annual NOx Modeling Results

		_	-	,	_					
Percent of	Standard		> SIL	51%	15%	51%	15%	52%	15%	
Class II	ווכופוופ	(µg/m³)	1	25	1	25	1	25	1	
WAAQS		(µg/m³)	1	1	100	1	100	1	100	
Class II	SIL	(µg/m³)	-	1	1	t	1	1	1	
Background	202	(µg/m³)	_1	_1_	2		2	1	2	
Maximum Predicted	Impact 2	(µg/m³)	16.90	12 68	200.5	77 07	12.71		12.94	
no	7007	ובמו		2014		7,700	2014		2014	
Maximum Impact Location	Elevation	(m)		2207		7000	7707	1	2207	
ximum Imp	UTM Y	(m)		4700350		010001	4700350		4700350	
Ma	UTM X	(m)		607500		-	006/09			
c	sonices			SHB 13-26		SHB 13-26	and SHB 1-29	SHB 13-26,	SHB 1-29 and 607500 offsite	
Averaging	Period 1			Annual			Annual		Annual	
:	Pollutant			NO2		(NC 2		NO ₂	

Highest-first-high concentration over all years modeled.

² ARM value of 0.75 applied to modeled impact for comparison to the WAAQS and increment; 100% conversion to NO₂ assumed for comparison to the SIL.

³ Background value of 1 ppb provided by WDEQ on May 20, 2015.



Table 2: SHB 13-26 Annual Formaldehyde Modeling Results

			2	laximum lmp	Maximum Impact Location		Maximum	2.3
Pollutant	Sources	Averaging Period	NTM X	V MTU	Elevation	3	Impact	Impact cancer Kisk
			(m)	(m)	(m)	rear	(µg/m³)	(per million)
Formaldehyde	SHB 13-26	Annual ¹	607500	4700350	2207	2014	1.62	9.0
Formaldehyde	SHB 13-26 and SHB 1-29	Annual ¹	607500	4700350	2207	2014	1.62	9.0
Formaldehyde	SHB 13-26, Formaldehyde SHB 1-29 and offsite	Annual ¹	607500	4700350	2207	2014	1.64	9.1

¹ Highest-first-high concentration over all years modeled.

 2 Formaldehyde cancer chronic inhalation factor = 1.30E- $05 \, (\mu g/m^3)^{-1}$ from http://www2.epa.gov/sites/production/files/2014-05/documents/table1.pdf.

 3 The cancer risk is calculated by: 1.30E-05 x modeled concentration x 10^6 x (30/70) where 30 represents the life of project.





ATTACHMENT B - Emissions Calculations and Supporting Documentation



Jonah Energy , LLC - SHB 13-26 Compressor Station Modeling Parameters and Emission Rates per Source

_		ž	NOx	Formaldehyde	lehyde							Stack/E)	Stack/Exhaust Parameters	s						
0	Emission Unit	short-term	Annual	Annual short-term	Annual	Direction Capped?	Capped?	Height Ab	Height Above Grade	Diar	Diameter	Flow		Vel	Velocity	Ţ	Temperature	e.	Easting	Northing
Cat	Cat G3516TA Gas Compressor #1	0.1429 g/s	0.1429 g/s	0.1429 g/s 0.1429 g/s 0.0143 g/s 0.0143 g/s	0.0143 g/s	Vertical	oN N	26.25 ft	8.00 m	0.83 ft	0.25 m	3,088 acfm	1.46 cubic m/s	94.35 ft/sec	1.46 cubic m/s 94.35 ft/sec 28.76 m/sec	912 F	489 C 762 K		607486.5	4700387.2
Cat	Cat G3516TA Gas Compressor #2	0.1429 g/s	0.1429 g/s	0.0143 g/s 0.0143 g/s	0.0143 g/s	Vertical	°Z	26.25 ft	8.00 m	0.83 ft	0.25 m	3,088 acfm	1.46 cubic m/s	94.35 ft/sec	28.76 m/sec	912 F	489 C	762 K	607490.8	4700368.7
Set	Separator Heater #1	0.0113 g/s		0.0113 g/s 0.00001 g/s 0.00001 g/s		Vertical	o _N	12.00 ft	3.66 m	0.50 ft	0.15 m	647 acfm	0.31 cubic m/s	0.31 cubic m/s 54.89 ft/sec	16.73 m/sec	601 F	316 C	589 K	607511.4	4700408.0
Sec	Separator Heater #2	0.0113 g/s	0.0113 q/s	0.0113 g/s 0.0113 g/s 0.00001 g/s 0.00001 g/s		Vertical	oN.	12.00 ft	3.66 m	0.50 ft	0.15 m	647 acfm	0.31 cubic m/s 54.89 ft/sec	54.89 ft/sec	16.73 m/sec	601 F	316 C	589 K	607512.7	4700408.0

Table A-1Jonah Energy , LLC - SHB 13-26 Compressor StationEstimated Potential Uncontrolled Emissions per Source

				Annual Emiss	Annual Emission Rate - Uncontrolled	controlled		
Ω	Emission Unit	NOx	00	VOC	SO ₂	PM ₁₀	PM _{2.5}	Total HAP
_	Cat G3516TA Gas Compressor #1	111.29 tpy	130.17 tpy	6.96 tpy	0.49 tpy	0.75 tpy	0.75 tpy	0.95 tpy
2	Cat G3516TA Gas Compressor #2	111.29 tpy	130.17 tpy	6.96 tpy	0.49 tpy	0.75 tpy	0.75 tpy	0.95 tpy
8	Separator Heater #1	0.39 tpy	0.33 tpy	0.02 tpy	0.00 tpy	0.03 tpy	0.03 tpy	0.007 tpy
4	Separator Heater #2	0.39 tpy	0.33 tpy	0.02 tpy	0.00 tpy	0.03 tpy	0.03 tpy	0.007 tpy
	Totals	223.4 tpy	261.0 tpy	14.0 tpy	1.0 tpy	1.6 tpy	1.6 tpy	1.9 tpy

Table A-1a Jonah Energy , LLC - SHB 13-26 Compressor Station Estimated Potential Controlled Emissions per Source

				Annual Emis	Annual Emission Rate - Uncontrolled	controlled		
О	Emission Unit	NOx	00	voc	SO ₂	PM ₁₀	PM _{2.5}	Total HAP
~	Cat G3516TA Gas Compressor #1	4.97 tpy	14.90 tpy	4.97 tpy	0.49 tpy	0.75 tpy	0.75 tpy	0.82 tpy
2	Cat G3516TA Gas Compressor #2	4.97 tpy	14.90 tpy	4.97 tpy	0.49 tpy	0.75 tpy	0.75 tpy	0.82 tpy
m	Separator Heater #1	0.39 tpy	0.33 tpy	0.02 tpy	0.00 tpy	0.03 tpy	0.03 tpy	0.007 tpy
4	Separator Heater #2	0.39 tpy	0.33 tpy	0.02 tpy	0.00 tpy	0.03 tpy	0.03 tpy	0.007 tpy
	Totals	10.7 tpy	30.5 tpy	10.0 tpy	1.0 tpy	1.6 tpy	1.6 tpy	1.7 tpy

		Engine I	Data	
IC Engir	ne Make	Caterpillar	Fuel LHV	1,011 Btu/scf
IC Engine	e Model	G3516TA (4SRB)	Fuel HHV	1,119 Btu/scf
Sulfur Content	of Fuel	0.0500 gr/scf	Number of Engines	2
Hours p	er Year	8,760 hr/yr		
	Load	100% Max ¹	75% Load	50%
Power	r Rating	1,029 bhp	772 bhp	515 bhp
Specific Fuel Consumption	LHV	7,700 Btu/bhp-hr	8,080 Btu/bhp-hr	9,196 Btu/bhp-hr
Fuel Consumptio	n (LHV)	7,836.1 scf/hr	6,171.1 scf/hr	4,679.3 scf/hr
Fuel Consumptio	n (LHV)	68.6 MMscf/yr	54.1 MMscf/yr	41.0 MMscf/yr
Duty (inpu	t) - HHV	8.77 MMBtu/hr	6.90 MMBtu/hr	5.24 MMBtu/hr
Duty (inpu	t) - LHV	7.92 MMBtu/hr	6.24 MMBtu/hr	4.73 MMBtu/hr
Exhaust Stac	k Temp	912 F	855 F	786 F

2,271 acfm

3,088 acfm

	Eı	mission Factors @ Loa	ads	Add-On Control &	
Pollutant	100% Load	75% Load	50%	Efficiency	Source
NO_x	11.20 g/bhp-hr	12.10 g/bhp-hr	11.10 g/bhp-hr	NSCR	0.5 b/bhp-hr WDEQ BACT
CO	13.10 g/bhp-hr	10.20 g/bhp-hr	16.20 g/bhp-hr	NSCR	1.5 g/bhp-hr WDEQ BACT
NMHC	0.70 g/bhp-hr	0.70 g/bhp-hr	0.70 g/bhp-hr	NSCR	0.5 b/bhp-hr WDEQ BACT
SO ₂	0.01276 lb/MMBtu	0.012756 lb/MMBtu	0.012756 lb/MMBtu	None	AP42 Tbl 3.2-2
PM ₁₀	0.019410 lb/MMBtu	0.019410 lb/MMBtu	0.019410 lb/MMBtu	None	AP42 Tbl 3.2-2
PM _{2.5}	0.019410 lb/MMBtu	0.019410 lb/MMBtu	0.019410 lb/MMBtu	None	AP42 Tbl 3.2-2
НСНО	0.05 g/bhp-hr	0.05 g/bhp-hr	0.05 g/bhp-hr	NSCR	0.05 g/bhp-hr WDEQ BACT
CO ₂	53.02000 kg/MMBtu	53,02000 kg/MMBtu	53.02000 kg/MMBtu	None	Part 98, Subpart C
CH ₄	1.61 g/bhp-hr	1.53 g/bhp-hr	2.12 g/bhp-hr	None	Manufacturer
N ₂ O	0.00010 kg/MMBtu	0.00010 kg/MMBtu	0.00010 kg/MMBtu	None	Part 98, Subpart C

1,511 acfm

			One Cat G3	516TA Eng	ine - Contro	olled Emis	sion Rates	- All Load	S			
Pollutant	100)%	75% L	.oad	50%	6	100	%	75% l	oad	50	%
Tonutant	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	TPY	g/s	TPY	g/s	TPY	g/s
NO _x	1.13	0.1429	0.92	0.1159	0.56	0.0708	4.97	0.1429	4.03	0.1159	2.46	0.0708
CO	3.40	0.4288	1.99	0.2505	2.10	0.2651	14.90	0.4288	8.71	0.2505	9.22	0.2651
NMHC	1.13	0.1429	0.85	0.1073	0.57	0.0715	4.97	0.1429	3.73	0.1073	2.48	0.0715
SO ₂	0.112	0.0141	0.0881	0.0111	0.0668	0.0084	0.49	0.0141	0.39	0.0111	0.29	0.0084
PM ₁₀	0.17	0.0214	0.13	0.0169	0.10	0.0128	0.75	0.0214	0.59	0.0169	0.45	0.0128
PM _{2.5}	0.170	0.0214	0.134	0.0169	0.102	0.0128	0.745	0.0214	0.587	0.0169	0.445	0.0128
НСНО	0.11	0.0143	0.09	0.0107	0.06	0.0071	0.50	0.0143	0.37	0.0107	0.25	0.0071
CO ₂	1,024.79	129.12	807.04	101.68	611.95	77.10	4,488.6	129.12	3,534.8	101.68	2,680.3	77.10
CH ₄	2.61	0.3287	1.86	0.2344	1.72	0.2164	11.43	0.3287	8.15	0.2344	7.52	0.2164
N ₂ O	0.002	0.0002	0.002	0.0002	0.001	0.0001	0.008	0.0002	0.007	0.0002	0.005	0.000

	Em	issions Su	mmary - W	orst Case F	ull Load (1	00%)		
	One	(1) Cat G3	516TA - 10	0%	2	Cat 3516TA	- 100%	
	Unconf	rolled	Contro	olled	Uncont	rolled	Contro	olled
Pollutant	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
NO _x	25.41	111.29	1.13	4.97	50.82	222.57	2.27	9.94
CO	29.72	130.17	3.40	14.90	59.44	260.33	6.81	29.81
NMNEHC	1.59	6.96	1.13	4.97	3.18	13.91	2.27	9.94
SO ₂	0.11	0.49	0.11	0.49	0.22	0.98	0.22	0.98
PM ₁₀	0.17	0.75	0.17	0.75	0.34	1.49	0.34	1.49
PM _{2.5}	0.170	0.745	0.170	0.745	0.340	1.491	0.340	1.491
НСНО	0.11	0.50	0.11	0.50	0.23	0.99	0.23	0.99
CO ₂	120.3	526.8	120.3	526.8	240.6	1,053.6	240.6	1,053.6
CH ₄	3.65	16.00	2.61	11.43	7.30	31.99	5.22	22.85
N ₂ O	0.002	0.008	0.002	0.008	0.004	0.017	0.004	0.017
CO ₂ e		865.4 tpy		769.4 tpy	1,	730.8 tpy	1,	538.8 tpy

Sample Calcs

(bhp) (Btu/bhp-hr) (MM/10⁵) = MMBtu/hr; (MMBtu/hr) / (Btu/scf) (10⁶/MM) = scf/hr

 $(g/bhp-hr) \ (bhp) \ (lb/453.59 \ g) = lb/hr; \quad (lb/MMBtu) \ (MMBtu/hr) = lb/hr; \quad (kg/MMBtu) \ (MMBtu/hr) \ (2.2046 \ lb/kg) = lb/hr$

(lb/hr) (hrs/yr) (ton/2000 lb) = tons/yr

Exhaust Gas Flow

(lb/hr) (453.59 g/lb) (hr/60 min) (min/60 sec) = g/sec; (ton/yr) (2,000 lb/ton) (453.59 g/lb) (8760 hr/yr) (hr/60 min) (min/60 sec) = g/sec

Notes:

Hp, fuel consumption & uncontrolled emission factors for NO_x, CO, NMHC from Caterpillar specific technical data sheet, Ref. Data Set DM5172-02, printed 01Feb-99.

 $1,050 \; hp \; 100\% \; load \; rating \; ^*0.98 \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 525 \; hp \; (50\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 525 \; hp \; (50\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 525 \; hp \; (50\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 525 \; hp \; (50\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 525 \; hp \; (50\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 525 \; hp \; (50\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 525 \; hp \; (50\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; \& \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; @ \; 7,000 \; ft \; and \; 50°F \; inlet \; temp. \; \; Same \; for \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; @ \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; @ \; 788 \; hp \; (75\% \; load) \; de-rate \; factor \; % \; Same \; factor \; % \; Same$

Exhaust flow adjusted for 7,000 ft elevation or 11.5 psia

 $Controlled\ emissions\ for\ NO_{x},\ CO,\ VOC,\ \&\ HCHO\ are\ based\ on\ proposed\ WDEQ\ BACT\ limits\ (0.5,\ 1.0,\ 0.7,\ \&\ 0.05\ g/bhp-hr)$

 SO_2 emissions based on sulfur content of gas (5 grains S/100 scf and 100% conversion).

Emission factor for PM₁₀ and PM_{2.5} from EPA, AP-42 Chapter 3.2, Table 3.2-3, including PM₁₀ and PM_{2.5} filterable plus PM condensable.

Jonah Energy, LLC - SHB 13-26 Compressor Station Gas Compression IC Engine HAP Emissions Calculations

		Uncontrolle Ra	ed Emission tes	Control	led Emission	Rates		
	Emission Factor ¹	One E	ingine		One Engine		2	Engines
Pollutant		(lb/hr) ²	(lbs/yr) ³	(lb/hr) ²	(lbs/yr) ³	(tpy) ⁴	(lb/hr)	(tpy)
1,1,2,2-Tetrachloroethane	2.53E-05 lb/MMBtu	0.0002	1.94	0.0002	1.39	0.0007	0.0003	0.0014
1,1,2-Trichloroethane	1.53E-05 lb/MMBtu	0.0001	1.18	0.0001	0.84	0.0004	0.0002	0.0008
1.3-Butadiene	6.63E-04 lb/MMBtu	0.0058	50.92	0.0042	36.37	0.0182	0.0083	0.0364
1,3-Dichloropropene	1.27E-05 lb/MMBtu	0.0001	0.98	0.0001	0.70	0.0003	0.0002	0.0007
Acetaldehyde	2.79E-03 lb/MMBtu	0.0245	214.28	0.0175	153.05	0.0765	0.0349	0.1531
Acrolein	2.63E-03 lb/MMBtu	0.0231	201.99	0.0165	144.28	0.0721	0.0329	0.1443
Benzene	1.58E-03 lb/MMBtu	0.0139	121.35	0.0099	86.68	0.0433	0.0198	0.0867
Carbon Tetrachloride	1.77E-05 lb/MMBtu	0.0002	1.36	0.0001	0.97	0.0005	0.0002	0.0010
Chlorobenzene	1.29E-05 lb/MMBtu	0.0001	0.99	0.0001	0.71	0.0004	0.00	0.00
Chloroform	1.37E-05 lb/MMBtu	0.0001	1.05	0.0001	0.75	0.0004	0.00	0.00
Ethylbenzene	2.48E-05 lb/MMBtu	0.0002	1.90	0.0002	1.36	0.0007	0.0003	0.0014
Formaldehyde ⁴	0.05 g/bhp-hr	0.1134	993.6330	0.1134	993.63	0.50	0.23	0.99
Methanol	3.06E-03 lb/MMBtu	0.0268	235.01	0.0192	167.87	0.0839	0.0383	0.1679
Methylene Chloride	4.12E-05 lb/MMBtu	0.0004	3.16	0.0003	2.26	0.0011	0.0005	0.0023
Naphthalene	9.71E-05 lb/MMBtu	0.0009	7.46	0.0006	5.33	0.0027	0.0012	0.0053
PAH	1.41E-04 lb/MMBtu	0.0012	10.83	0.0009	7.74	0.0039	0.0018	0.0077
Styrene	1.19E-05 lb/MMBtu	0.0001	0.91	0.0001	0.65	0.0003	0.0001	0.0007
Toluene	5.58E-04 lb/MMBtu	0.0049	42.86	0.0035	30.61	0.0153	0.0070	0.0306
Vinyl Chloride	7.18E-06 lb/MMBtu	0.0001	0.55	0.0000	0.39	0.0002	0.0001	0.0004
Xylene	1.95E-04 lb/MMBtu	0.0017	14.98	0.0012	10.70	0.0053	0.0024	0.0107
			Totals	0.19	1,646.3	0.82	0.38	1.65
			Maximum	Individual H	AP (HCHO)	0.50		0.99

Make Caterpillar

Model G3516TA (4SRB)

Number of IC Engines 2

Hours of Operation 8,760 hr/yr

Heat Input (LHV) 5 Heat Input (HHV) 6

7.92 MMBtu/hr

8.77 MMBtu/hr

Horsepower 1,029 bhp

Catalyst CE for HAPs 7

Specific Fuel Consumption 7,700 Btu/bhp-hr

Catalyst CE for HCHO 7 0.05 g/bhp-hr

Notes:

- ¹ Emission factors from AP-42, Section 3.2, Table 3.2-3 (7/00) 4-stroke rich-burn (4SRB) engines
- 2 (MMBtu/hr [HHV]) (lb/MMBtu) = lb/hr; (lb/hr) (100 % control) / 100 = lb/hr 3 (b/hr) (8760 hr/yr) / (2,000 lb/ton) = tpy; (tpy) (100 - % control) / 100 = tpy
- Formaldehyde emission factor based on WDEQ BACT for 4SRB engine.
- LHV heat input rate for the engine is based on LHV fuel consumption rate for one engine from manufacturer spec sheet.

[LHV Btu/bhp-hr] * [bhp] / 1,000,000 = MMBtu/hr

 $^{\rm 6}$ $\,$ AP-42 EFs are based on HHV, therefore, Heat Input for HHV was used.

[HHV Btu/bhp-hr] * [bhp] / 1,000,000 = MMBtu/hr

Catalyst control efficiency based on manufacturer-specified percent reduction

Table A-3 Jonah Energy , LLC - SHB 13-26 Compressor Station
Natural Gas-Fired Heater Treater Criteria Pollutant Emissions Calculations

Emission Source:	Separator Heater
Source Type:	Natural Gas-Fired Heater
Heat Input:	1.00 MMBtu/hr
Natural Gas Higher Heating Value (HHV):	1,119 Btu/scf
Fuel Consumption (HHV):	0.0009 MMscf/hr
Fuel Consumption (HHV):	7.83 MMscf/yr
Operating Hours per Year:	8,760 hr/yr
Sulfur Content of Fuel:	0.0500 gr/scf
Exhaust Stack Temp:	601 F
Exhaust Gas Flow:	647 acfm
Number of Units:	2

			One	Heater	
	Emission	Short-	term	Anr	nual
Pollutant	Factors ¹	lb/hr ²	g/sec	tpy ³	g/sec
NO _x	100.0 lb/MMscf	0.09	0.0113	0.39	0.0113
CO	84.0 lb/MMscf	0.08	0.0095	0.33	0.0095
VOC	5.5 lb/MMscf	0.005	0.0006	0.02	0.0006
SO ₂	0.013 lb/MMBtu	0.00001	0.0000	0.00005	0.0000
PM ₁₀	7.6 lb/MMscf	0.01	0.0009	0.03	0.0009
PM _{2.5}	7.6 lb/MMscf	0.01	0.0009	0.03	0.0009
CO ₂	53.02 kg/MMBtu	116.9	14.73	512.0	14.73
CH ₄	0.001 kg/MMBtu	0.002	0.0003	0.010	0.0003
N ₂ O	0.0001 kg/MMBtu	0.000	0.0000	0.001	0.0000
			CO ₂ e		512.5 tpy

Notes:

AP42 Tble 1.4-2 indicates that all PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate $P_1MPM_{2.5}$ or PM_1 emissions.

¹ Emission factors (lb/MMscf) based on USEPA AP-42, Section 1.4, Table 1.4-2, dated July 1998

² Hourly Emission Rate (lb/hr) = (lb/MMscf) * (MMscf/hr); or (kg/MMBtu) (MMBtu/hr) (2.2046 lb/kg)

Annual Emission Rate (tpy) = (lb/hr) (hrs/yr) (ton/2000 lb)

Jonah Energy , LLC - SHB 13-26 Compressor Station Natural Gas-Fired Heater Treater HAP Emissions Calculations

		Emission	Ē	Emission Rate	es
		Factor		One Heater	
Pollutant	Type ¹	(lb/MMscf) 2	(lb/hr) ³	(lbs/yr)	(tpy) 4
2-Methylnaphthalene	HAP	2.4E-05	2.15E-08	1.88E-04	9.40E-08
3-Methylchloranthrene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
7,12-Dimethylbenz(a)anthracene	HAP	1.6E-05	1.43E-08	1.25E-04	6.26E-08
Acenaphthene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Acenaphthylene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Anthracene	HAP	2.4E-06	2.15E-09	1.88E-05	9.40E-09
Benz(a)anthracene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Benzene	HAP	2.1E-03	1.88E-06	1.64E-02	8.22E-06
Benzo(a)pyrene	HAP	1.2E-06	1.07E-09	9.40E-06	4.70E-09
Benzo(b)fluoranthene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Benzo(g,h,i)perylene	HAP	1.2E-06	1.07E-09	9.40E-06	4.70E-09
Benzo(k)fluoranthene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Chrysene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Dibenzo(a,h)anthracene	HAP	1.2E-06	1.07E-09	9.40E-06	4.70E-09
Dichlorobenzene	HAP	1.2E-03	1.07E-06	9.40E-03	4.70E-06
Fluoranthene	HAP	3.0E-06	2.68E-09	2.35E-05	1.17E-08
Fluorene	HAP	2.8E-06	2.50E-09	2.19E-05	1.10E-08
Formaldehyde	HAP	7.5E-02	6.70E-05	5.87E-01	2.94E-04
n-Hexane	HAP	1.8E+00	1.61E-03	1.41E+01	7.05E-03
Indeno(1,2,3-cd)pyrene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Naphthalene	HAP	6.1E-04	5.45E-07	4.78E-03	2.39E-06
Phenanathrene	HAP	1.7E-05	1.52E-08	1.33E-04	6.66E-08
Pyrene	HAP	5.0E-06	4.47E-09	3.91E-05	1.96E-08
Toluene	HAP	3.4E-03	3.04E-06	2.66E-02	1.33E-05
					7.37E-03

Natural Gas-Fired Heater 8,760 hr/yr Maximum Heat Input 1.00 MMBtu/hr

Natural Gas Heating Value 1,119 Btu/scf Fuel Consumption (LHV) 0.0009 MMscf/hr

Number of Heaters 2

Fuel Consumption (LHV) 7.83 MMscf/yr

Total HAPs 0.007 tpy Max HAP 0.007 tpy

Notes:

- ¹ Type = HAP for Hazardous Air Pollutant.
- ² Emission factors from AP-42, Section 1.4, Table 1.4-3 (7/98).
- ³ Hourly Emission Rate (lb/hr) = [(MMBtu/Hr) * (lb/MMscf)] / [(BTU/scf)]
- ⁴ Annual Emission Rate (tpy) = (lb/hr) * (8760 hr/yr) / (2,000 lb/ton)

G3516 TA

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED:	1200	FUEL:	NAT GAS
COMPRESSION RATIO:	9.0:1	FUEL SYSTEM:	HPG IMPCO
AFTERCOOLER (°F)	130	WITH AIR FUE	RATIO CONTROL
JACKET WATER (°F)	210	MIN. FUEL PRESS. (PSIG):	25
COOLING SYSTEM:	COMBINED	MIN. METHANE NUMBER:	80
IGNITION SYSTEM:	EIS	RATED ALTITUDE (FT):	5000
EXHAUST MANIFOLD:	WET	AT AMBIENT TEMP (°F):	77
COMBUSTION:	STOICH	NOx EMISSION LEVEL:	CATALYST
		PRICE LIST SETTING:	PA-4880

RATING AND EFFICIENCY	NOTES	LOAD	100%	75%	50%
LHV OF FUEL		BTU/SCF	920	920	920
ENGINE POWER		BHP	1050	788	525
ENGINE EFFICIENCY	(1)	%	33.1	31.5	27.7
THERMAL EFFICIENCY	(6)	%	54.6	56.5	61.0
TOTAL EFFICIENCY	(7)	%	87.7	88.1	88.7

ENGINE DATA					
FUEL CONSUMPTION	(1)	BTU/bhp-hr	7700	8080	9196
AIR FLOW (77 °F, 14.7 psi)	(WET)	SCFM	1365	1046	732
AIR FLOW	(WET)	lb/hr	6054	4639	3246
COMPRESSOR OUT PRESS.		in. HG (abs)	60.9	58	52.4
COMPRESSOR OUT TEMP.		°F	257	238	209
INLET MAN. PRESS.		in. HG (abs)	54.5	46	38.5
INLET MAN. TEMP.	(11)	°F	133	133	131
TIMING	(12)	°BTDC	23	23	23
NOISE - MECH @ 1m		dB(A)	100	99	98
NOISE - EXH @ 1.5m		dB(A)	111	110	109
EXHAUST STACK TEMP.		°F	912	855	786
EXHAUST GAS FLOW (@ stack temp.)	(WET)	CFM, 14.5 psi	3893	2863	1905
EXHAUST MASS	(WET)	lb/hr	6449	4951	3476

EMISSIONS DATA					
NOx (as NO2)	(10)	g/bhp-hr	11.2	12.1	11.1
CO	(10)	g/bhp-hr	13.1	10.2	16.2
THC	(10)	g/bhp-hr	1.9	1.8	2.5
NMHC	(10)	g/bhp-hr	0.29	0.27	0.38
EXHAUST 02	(10)	%	0.3	0.2	0.2
LAMBDA			1.01	1.02	1.01

HEAT BALANCE DATA					
LHV INPUT	(1)	BTU/min	134750	106052	80463
HEAT REJ. TO JACKET	(2)(8)	BTU/min	48958	41715	36270
HEAT REJ. TO ATMOSPHERE	(4)	BTU/min	4554	3795	3037
HEAT REJ. TO LUBE OIL	(5)	BTU/min	7731	6588	5728
HEAT REJ. TO EXH. (LHV to 77°F)	(2)	BTU/min	25989	18587	12129
HEAT REJ. TO EXH. (LHV to 350°F)	(2)	BTU/min	16938	11665	7086
HEAT REJ. TO A/C	(3)(9)	BTU/min	2968	1955	1025

CONDITIONS AND DEFINITIONS

ENGINE RATING OBTAINED AND PRESENTED IN ACCORDANCE WITH ISO 3046/1 (STD. REF. CONDITIONS OF 25°C, 100 KPA). NO OVERLOAD PERMITTED AT RATING SHOWN. CONSULT ALTITUDE CURVES FOR APPLICATIONS ABOVE MAXIMUM RATED ALTITUDE AND/OR TEMPERATURE.

NOTES

- 1) FUEL CONSUMPTION TOLERANCE ACCORDING TO ISO 3046/1. TOLERANCE IS + 5% OF FULL LOAD DATA.
- 2) HEAT REJECTION TO JACKET AND EXHAUST TOLERANCE IS ± 10% OF FULL LOAD DATA.
- 3) HEAT REJECTION TO A/C TOLERANCE IS ± 5% OF FULL LOAD DATA.
- 4) HEAT REJECTION TO ATMOSPHERE TOLERANCE IS $\pm\,50\%$ OF FULL LOAD DATA.
- 5) HEAT REJECTION TO LUBE OIL TOLERANCE IS ± 20% OF FULL LOAD DATA.
- 6) THERMAL EFFICIENCY: JACKET HEAT + LUBE OIL HEAT + EXH. HEAT TO 350°F.
- 7) TOTAL EFFICIENCY: ENGINE EFF. + THERMAL EFF. TOLERANCE IS ± 10% OF FULL LOAD DATA.
- 8) TOTAL JW HEAT:
 - COMBINED = JACKET HEAT + OIL COOLER HEAT (heat rate based on treated water)
 - 2-CIRCUIT AND 3 CIRCUIT = JACKET HEAT (heat rate based on treated water)
- 9) TOTAL A/C HEAT:
- COMBINED AND 3-CIRCUIT = A/C HEAT x A/C HEAT REJ. FACTOR (heat rate based on treated water)
 - 2-CIRCUIT = A/C HEAT x A/C HEAT REJ. FACTOR + O/C HEAT
- 10) EMISSION DATA SHOWN ARE DRY AND NOT TO EXCEED VALUES. PUBLISHED PART LOAD DATA REQUIRES AIR FUEL RATIO CONTROL.
- 11) MEASURED IN THE INTAKE MANIFOLD PLENUM.
- 12) TIMING INDICATED IS FOR USE WITH THE MINIMUM FUEL METHANE NUMBER SPECIFIED. CONSULT THE APPROPRIATE FUEL USAGE GUIDE FOR TIMING AT OTHER METHANE NUMBERS.

G3516 TA

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

FUEL USAGE GUIDE											
			DERA"	TE FACTO	DR/ENGIN	IE TIMING	vs METH	ANE NUN	MBER		
<30	30	40	49	50	60	64	65	70	75	80	83 to 100
0/	0.59/14	0.59/16	0.59/18	0.90/14	0.90/16	0.90/17	1.0/16	1.0/18	1.0/21	1.0/22	1.0/23

		ALTI	TUDE D	ERATIO	N FACT	ORS								
Α	130	1.00	1.00	1.00	0.98	0.94	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.70
M	120	1.00	1.00	1.00	1.00	0.96	0.93	0.89	0.86	0.83	0.80	0.77	0.74	0.71
В	110	1.00	1.00	1.00	1.00	0.98	0.94	0.91	0.87	0.84	0.81	0.78	0.75	0.72
1	100	1.00	1.00	1.00	1.00	1.00	0.96	0.92	0.89	0.86	0.82	0.79	0.76	0.73
E	90	1.00	1.00	1.00	1.00	1.00	0.98	0.94	0.91	0.87	0.84	0.81	0.78	0.75
Ν	80	1.00	1.00	1.00	1.00	1.00	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76
Т	70	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.94	0.90	0.87	0.84	0.81	0.77
	60	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.96	0.92	0.89	0.85	0.82	0.79
°F)	50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.94	0.90	0.87	0.84	0.80
		0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
						ΔΙ	TITLINE	FEET AR	OVE SEA	LEVELY				

Т	70 60	1.00	1.00	1.00	1.03	1.11	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
E	90 80	1.01	1.09	1.17	1.25	1.33	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
1	100	1.12	1.20	1.28	1.36	1.44	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
В	110	1.22	1.30	1.38	1.47	1.55	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
M	120	1.33	1.41	1.49	1.58	1.66	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Α	130	1.43	1.51	1.60	1.69	1.77	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86

FUEL USAGE GUIDE:

This table shows the derate factor required for a given fuel and what engine timing to use. Note that deration occurs as the methane number decreases. Methane number is a scale to measure ignition and burning characteristics of various fuels. Representative values are shown below.

Methane	100
Ethane	44
Propane	34
n-Butane	10
Hydrogen	0

Most dry pipeline natural gas has a methane number of 67 or above. The gas quality should be analyzed to determine the percentage of each constituent and then determine the methane number. Consult the dealer or factory for assistance.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various ambient temperatures and altitudes. Use this information to help determine actual engine power for your site.

ACTUAL ENGINE RATING:

It is important to note that the Altitude/Temperature deration and the Fuel Usage Guide deration are not cumulative, i.e., they are not to be added together. The same is true for the Low Energy Fuel deration (reference the Caterpillar Methane Number Program) and the Fuel Usage Guide deration. However, the Altitude/Temperature deration and Low Energy Fuel deration are cumulative; and they must be added together in the method shown below. To determine the actual power available, take the lowest rating between 1) and 2).

- 1) (Altitude/Temperature Deration) + (Low Energy Fuel Deration)
- 2) Fuel Usage Guide Deration

Note: For NA's always add the Low Energy Fuel deration to the Altitude/Temperature deration. For TA engines only add the Low Energy Fuel deration to the Altitude/Temperature deration is less than 1.0 (100%). This will give the actual rating for the engine at the conditions specified.

AFTERCOOLER HEAT REJECTION FACTORS:

Aftercooler heat rejection is given for standard conditions of 77°F and 500 ft altitude. To maintain a constant inlet air manifold temperature, as the ambient air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor to adjust for ambient and altitude conditions. Multiply this factor by the standard aftercooler heat rejection. Failure to properly account for these factors could result in detonation and cause the engine to shut down or fail.

DM5172-02



ATTACHMENT C - IMPACT Application Forms





Air Quality Division

New Source Review Permit Application Form Cover Sheet

QUALITY	Is this supplem currenlty under		ion to an applicati			
	Yes X				Date of Application:	8/19/2015
	Previous Appli	cation #:	AP-A0000942			
MPANY INFO	DRMATION:					
mpany Name:			Jonah	Energy LLC		
Iress:		707 :	17th Street, Suite			
: De	nver	State:	Colorado		Zip Code:	80202
ntry:	USA		Phone Num	ber:	720.577.1000	
CILITY INFOR	MATION:					
lity Name:		Stı	ud Horse Butte 13	-26 - Compressor	Engine	
Facility or Exist	ing Facility:	New				
ity Description:	Co	ompressor Engi	ne Installation as	part of Line Pressu	ure Reduction Project	
lity Class:	Minor			itus: Not Yet Insta		-
lity Type:	Pro	duction Site				
es, contact the	Division					
	Division.					
yes, contact the I Number(s): CS Code: CILITY LOCAT		21	1111 Crude Petro	oleum and Natural	Gas Extraction	
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address:	ION:	titude/longitude			Gas Extraction Both are not required.	
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address:	ION:	titude/longitude	area or section/tow			
Number(s): CS Code: CILITY LOCAT er the facility locat cical Address: E: WY	ION:	titude/longitude	area or section/tow			
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY	ION:	titude/longitude	area or section/tow		Both are not required.	Sublette
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY sude: 42.4	TION: tion in either the lat	iitude/longitude : Zi County: Longitude:	area or section/tow p Code:			Sublette
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY cude: 42.4 rter Quarter:	TION: tion in either the lat	ziitude/longitude : Zip County: Longitude:	area or section/tow p Code: -109.69178	nship/range area. E	Both are not required.	
Number(s): CS Code: CILITY LOCAT er the facility locat cical Address: e: WY ude: 42.4 rter Quarter: ion:	TION: tion in either the lat 44618 SW 26	Zip County: Longitude:	area or section/tow p Code: -109.69178 Quarter: 29N	vnship/range area. E	Both are not required. County:	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY Lude: 42.4 rter Quarter: ion: For longitud	TION: tion in either the lat 44618 SW 26 e and latitude, us	Zip County: Longitude:	area or section/tow p Code: -109.69178 Quarter: 29N	vnship/range area. E	County:	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY Lude: Value: Value:	144618 SW 26 Te and latitude, us	Zip County: Longitude: Township: se NAD 83/WG	area or section/tow p Code: -109.69178 Quarter: 	vnship/range area. E	County: Range:	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY cude: 42.4 rter Quarter: ion: For longitud NTACT INFO ethat an Environment	tion in either the lat 44618 SW 26 e and latitude, us RMATION:	Zip County: Longitude: Township: se NAD 83/WG	area or section/tow p Code: -109.69178 Quarter: 29N 6584 datum and 5	SW digits after the d	County: Range:	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY dude: 42.4 rter Quarter: ion: For longitud NTACT INFO that an Environment :: Mr.	tion in either the lat 44618 SW 26 e and latitude, us RMATION:	Zip County: Longitude: Township: se NAD 83/WG	area or section/tow p Code: -109.69178 Quarter: 	SW digits after the d	County: Range:	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY Lude: 42.4 rter Quarter: ion: For longitud NTACT INFO that an Environment :: Mr. Name:	144618 SW 26 Te and latitude, use RMATION: Tal AND NSR Permitting	Zij County: Longitude: Township: se NAD 83/WG Contact is required First Name:	area or section/tow p Code: -109.69178 Quarter: 29N 5884 datum and 5	SW digits after the d	County: Range:	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY Lude: 42.4 rter Quarter: ion: For longitud NTACT INFO ethat an Environment et: Mr. Name: apany Name:	144618 SW 26 Te and latitude, use RMATION: Tal AND NSR Permitting	Zip County: Longitude: Township: se NAD 83/WG Contact is required First Name: Cornell	area or section/tow p Code: -109.69178 Quarter: 29N 5884 datum and 5	SW Sidigits after the diction of the deemed complete by Charles Energy LLC	County: Range:	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY Lude: 42.4 rter Quarter: ion: For longitud NTACT INFO e that an Environment e: Mr. Name: npany Name: o Title:	144618 SW 26 Te and latitude, use RMATION: Tal AND NSR Permitting	Zip County: Longitude: Township: se NAD 83/WG Contact is required First Name: Cornell	area or section/tow p Code: -109.69178 Quarter: 29N 6584 datum and 5 for your application to	SW Sidigits after the did the deemed complete by Charles Energy LLC ry Lead	County: Range:	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY Cude: 42.4 rter Quarter: ion: For longitud NTACT INFO e that an Environment e: Mr. Name: npany Name: Title: dress:	144618 SW 26 Te and latitude, use RMATION: Tal AND NSR Permitting	Zij County: Longitude: Township: se NAD 83/WG Contact is required First Name: Cornell	area or section/tow p Code: -109.69178 Quarter: 29N 6584 datum and 5 for your application to Jonah Sr. Regulator	SW Sidigits after the did the deemed complete by Charles Energy LLC ry Lead	County: Range: lecimal (i.e. 41.12345, -1	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e:	A4618 SW 26 Ge and latitude, us RMATION: Tal AND NSR Permitting	Zij County: Longitude: Township: se NAD 83/WG Contact is required First Name: Cornell	area or section/tow p Code: -109.69178 Quarter:	SW Sidigits after the did to the deemed complete by Charles Energy LLC ry Lead Suite 2700	County: Range: lecimal (i.e. 41.12345, -1	108W
Number(s): CS Code: CILITY LOCAT er the facility locat sical Address: e: WY Lude: 42.4 rter Quarter: cion: For longitud NTACT INFO e that an Environment e: Mr. Name: npany Name: o Title: dress: : Code: 80202	14618 SW 26 e and latitude, us RMATION: al AND NSR Permitting Denver	County: Longitude: Township: se NAD 83/WG Contact is required First Name: Cornell	area or section/town p Code: -109.69178 Quarter: 29N 6584 datum and 5 for your application to Jonah Sr. Regulator 707 17th Street, eate:	SW Sidigits after the did be deemed complete by Charles Energy LLC ry Lead Suite 2700 Color	County: Range: lecimal (i.e. 41.12345, -1	108W 07.56789)
CS Code: CILITY LOCAT Ter the facility locat sical Address: Tee: WY Atude: 42.4 Arter Quarter: tion: For longitud NTACT INFO The that an Environment	A4618 SW 26 Se and latitude, use RMATION: all AND NSR Permitting Denver T 720.577	Zip County: Longitude: Township: se NAD 83/WG Contact is required First Name: Cornell St	area or section/tow p Code: -109.69178 Quarter: 29N 6584 datum and 5 for your application to Jonah Sr. Regulator 707 17th Street, sate:	SW Sidigits after the did be deemed complete by Charles Energy LLC ry Lead Suite 2700 Color	County: Range: lecimal (i.e. 41.12345, -1	108W 07.56789)

Additional Contact Type (if needed): NSR Permitting contact	
Title: First Name:	
Last Name:	
Company Name:	
Job Title:	
Address:	
City: State:	
Zip Code:	
Primary Phone No.: E-mail:	
Mobile Phone No.: Fax No.:	
Contact Type: Start Date:	
FACILITY APPLICATION INFORMATION:	
General Info:	
Has the facility changed location or is it a new/ greenfield facility?	No
Has a Land Use Planning document been included in this application?	No
Is the facility located in a sage grouse core area?*	No
If the facility is in a sage grouse core area, what is the WER number?	IVO
* For questions about sage grouse core area, contact WY Game & Fish Department.	
Federal Rules Applicability - Facility Level:	
Prevention of Significant Deterioration (PSD):	
Non-Attainment New Source Review:	No
	No
Modeling Section:	
Has the Air Quality Division been contacted to determine if modeling is required?	Yes
Is a modeling analysis part of this application?	Yes
Is the proposed project subject to Prevention of Significant Deterioration (PSD) requirement Has the Air Quality Division been notified to schedule a pre-application meeting? Has a modeling protocol been submitted to and approved by the Air Quality Division? Has the Air Quality Division received a Q/D analysis to submit to the respective FLMs to determine the need for an AQRV analysis? Required Attachments: Facility Map Process Flow Diagram Modeling Analysis (if applicable) Land Use Planning Document Detailed Project Description Emissions Calculations	No No
I, Charles Cornell Sr. I	Regulatory Lead
Responsible Official (Printed Name)	Title
an Official Representative of the Company, state that I have knowledge of the facts herein so are true and correct to the best of my knowledge and belief. I further certify that the operation and emission rates listed on this application reflect the anticipated emissions due to the operation facility will operate in compliance with all applicable Wyoming Air Quality Standards and Research	tional information provided eration of this facility. The
Signature: White Bull	Date: 8/19/2015
(ink)	

Engine

Company Equipment		E1				and the same of	
Company Equipment	Description:		Natural gas	s-fired com	ipressor er	ngine #1 (Unit	4874)
Operating Status:	Not Yet Ins	rtalled		ı			
Initial Construction Co]	TDD		
					TBD		-
Initial Operation Com Most Recent Construc					TBD		-
Commencement Date		ICALIOII		-	TDD		
Commencement Date	•		-		ГВD		-
Most Recent Operation	n Commend	cement Date:		-	ГВО		
Select reason(s) for the	nis emission	s unit being in	cluded in th	nis applicat	tion (must	be complete	d regardless of date of
installation or modifi				• •	•		0
Reason	: Constructi	on (Greenfield	/New Facilit	:y)			
If reason is <i>Reconstru</i>	ction or Ter	nporary Permi	it or Other.	please exi	plain belov	v:	
		, ,	,	produce exp	piani sciot	••	
Name Plate Rating:	1050				Units:	hp	7
Site Rating:	1029				Units:	hp	
Primary Fuel Type:	Field Gas					<u> </u>	
Secondary Fuel Type:				L	7		
Model Name and Nun	nber:	G3516 TA			_		
Engine Type:	4 Strok	e Rich Burn					
Serial Number Trackin	ig Table:		1				
Serial Number:	WPS00138	3			Order Da	ate:	August 2015
Manufacturer Name:	-	Caterpillar					
Construction/Installat	ion Commer	ncement Date:		TBD			_
Operation Commence	ment/ Start	-up Date:		TBD			-
Manufacture Date:	6/6/2007	policy (a. the control of the contro		33333401070			=
Btu Content:	1119				Units:	BTU/scf	
Fuel Sulfur Content:	Negligible			-	Units:		
Type of Service:	Compressi	on					_
Is diesel engine EPA T				* If yes, lis	st EPA Tier	Rating	
				1 , , , ,		C C	
SCC Codes: List all Sou	ırce Classific	cation Code(s)	(SCC) that d	escribe the	e process(e	es) performed	I by the emission source
(e.g., 1-02-002-04).			a 150			/ 1	, and a second source
			20200)253			
Potential Operating	Schedule:	Provide the c	perating scl	nedule for	this emiss	ion unit.	
Hours/day		24	J				
Hours/yea		8760					

Control Equipment: Yes If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.
Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit? Yes No Pollutant:
Proposed BACT:
*If yes, attach BACT Analysis with this application.
Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit? Yes No Pollutant:
Proposed LAER:
*If yes, attach LAER Analysis with this application.
Federal and State Rule Applicability: New Source Performance Standards (NSPS): New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources. NSPS Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected
National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride). Part 61 NESHAP Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63 Part 63 NESHAP Subpart: Subpart ZZZZ - Existing - Area Source - Remote
Prevention of Significant Deterioration (PSD): These rules are found under WAQSR Chapter 6, Section 4.
Non-Attainment New Source Review: Not Affected These rules are found under WAQSR Chapter 6, Section 13.

Engine

Company Equipment ID:	E2				
Company Equipment Descri	ption:	Natural gas-fired	compressor en	igine #2 (Unit	4875)
Operating Status: Not	Yet Installed				
Initial Construction Comme			TBD		
Initial Operation Commence		-	TBD		-
Most Recent Construction/			TDD		-
Commencement Date:	Wodineation		TBD		
John March			100		-
Most Recent Operation Con	nmencement Date:		TBD		
Select reason(s) for this em	issions unit being in	cluded in this app	lication (must	be complete	d regardless of date of
installation or modification	ı):				
Reason: Cons	struction (Greenfield	/New Facility)			
If reason is <i>Reconstruction</i>	or Temporary Perm	it or Other, please	e explain belov	v:	
Name Plate Rating: 1050)		Units:	hp	7
Site Rating: 1029		-	Units:	hp	
Primary Fuel Type: Field	Gas				_
Secondary Fuel Type:					
Model Name and Number:	G3516 TA				
Engine Type: 4	Stroke Rich Burn				
Serial Number Tracking Tab	le:	<u></u>			
Serial Number: WPS	500136		Order Da	ate:	August 2015
Manufacturer Name:	Caterpillar				
Construction/Installation Co	ommencement Date:	: TBD			-
Operation Commencement	/ Start-up Date:	TBD			_
Manufacture Date: 6/6/	2007	Bullion of the Control of the Contro			_
Btu Content: 1119	9		Units:	BTU/scf	
Fuel Sulfur Content: Neg	ligible	The second second	Units:		
Type of Service: Com	pression				_
Is diesel engine EPA Tier Ce	rtified?	* If ye	es, list EPA Tier	Rating	
SCC Codes: List all Source C (e.g., 1-02-002-04).	lassification Code(s)	(SCC) that describ	e the process(es) performed	d by the emission source
Potential Operating Sched	ule: Provide the o	operating schedule	for this emiss	ion unit.	
Hours/day:	24				
Hours/year:	8760				

Control Equipment: Yes If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.
Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit? Yes No Pollutant:
Proposed BACT: *If yes, attach BACT Analysis with this application.
in yes, actual bite i kinalysis with this application.
Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit? Yes No Pollutant:
Proposed LAER:
*If yes, attach LAER Analysis with this application.
Federal and State Rule Applicability: New Source Performance Standards (NSPS): New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources. NSPS Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected
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National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63
Part 63 NESHAP Subpart: Subpart ZZZZ - Existing - Area Source - Remote
Prevention of Significant Deterioration (PSD): Not Affected These rules are found under WAQSR Chapter 6, Section 4.
Non-Attainment New Source Review: Not Affected These rules are found under WAQSR Chapter 6, Section 13.

Heater/Chiller

Company Equipment ID);	H1					
Company Equipment Description:		Indirect Heater #1 - 1.0 MMBtu/hr unit					
Operating Status:	Not Yet Ins	stalled					
Initial Construction Con	nmencemer	nt Date:		TBD			
Initial Operation Comm	encement [Date:		TBD			
Most Recent Construct	ion/ Modific	cation				_	
Commencement Date:				TBD			
Most Recent Operation				TBD		_	
Select reason(s) for thi		unit being i	ncluded in this ap	plication (mus	t be complet	ed regardless of date	
of installation or modif							
Reason	: Constructi	on (Greenfie	eld/New Facility)				
If reason is <i>Reconstruction</i> or <i>Temporary Permit</i> or <i>Other</i> , please explain below:							
Firing Type:	Indirect]				_	
Heat Input Rating:	1.0			Units:	MMBtu/h	r	
Primary Fuel Type:	Field Gas						
Secondary Fuel Type:							
Heat Content of Fuel:	1119				Units:	BTU/scf	
Fuel Sulfur Content:	Negligible			Units:			
SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).							
Potential Operating Schedule: Provide the Hours/day: 24		e operating schedu	ule for this emi	ssion unit.			
Hours/year	:	8760					
1.00.0, 7001							

Control Equipment: No If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.
Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit? Yes No Pollutant:
Proposed BACT:
*If yes, attach BACT Analysis with this application.
Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit? Yes No Pollutant:
Proposed LAER:
*If yes, attach LAER Analysis with this application.
Federal and State Rule Applicability: New Source Performance Standards (NSPS): New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources. NSPS Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected
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National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63 Part 63 NESHAP Subpart:
Prevention of Significant Deterioration (PSD): Not Affected These rules are found under WAQSR Chapter 6, Section 4.
Non-Attainment New Source Review: Not Affected These rules are found under WAQSR Chapter 6, Section 13.

Heater/Chiller

Company Equipment II):	H2				
Company Equipment Description:			Indirect Heater #2 -	1.0 MMBtu	/hr unit	
Operating Status: Initial Construction Cor	Not Yet Ins			TDD		
Initial Operation Comm				TBD TBD		
Most Recent Construct				100		•
Commencement Date:				TBD		
Most Recent Operation				TBD		
Select reason(s) for thi		unit being i	ncluded in this appli	cation (mus	t be complete	d regardless of date
of installation or modi						
Reason	: Constructi	on (Greenfie	ld/New Facility)			
If reason is <i>Reconstruc</i> i	tion or Tem	porary Perm	nit or Other, please e	explain belo	w:	
Firing Type:	Indirect]				
Heat Input Rating:	1.0		1	Units:	MMBtu/hr	
Primary Fuel Type: Secondary Fuel Type:	Field Gas					
Heat Content of Fuel:	1119				Units:	BTU/scf
Fuel Sulfur Content:	Negligible			Units:	Onits.	107301
SCC Codes: List all Sour source (e.g., 1-02-002-0		tion Code(s)		he process(es) performed	by the emission
			31000404			
1.			e operating schedule	for this emi	ssion unit.	
Hours/year	:	24 8760				

Control Equipment: No If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.
Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit? Yes No Pollutant:
Proposed BACT:
*If yes, attach BACT Analysis with this application.
Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit? Yes No Pollutant:
Proposed LAER:
*If yes, attach LAER Analysis with this application.
Federal and State Rule Applicability: New Source Performance Standards (NSPS): New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources. NSPS Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected
National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride). Part 61 NESHAP Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63 Part 63 NESHAP Subpart:
Prevention of Significant Deterioration (PSD): Not Affected These rules are found under WAQSR Chapter 6, Section 4.
Non-Attainment New Source Review: Not Affected These rules are found under WAQSR Chapter 6, Section 13.

Pollutant Emissions Form (submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

Efficiency Standards Pre-Controlled Potential Potential Potential Potential Emissions to Emit to Emit to Emit Basis for (PTE) (tons/yr) (lbs/hr) Units (tons/yr) Determination Criteria Pollutants: 1.) 0.37 1.6 AP-42 Particulate emissions (PE/PM) (formerly particulate matter, PM) 2.) 0.37 1.6 AP-42 PM #10 microns in diameter (PE/PM10) 3.) 0.37 1.6 AP-42 PM #2.5 microns in diameter (PE/PM2.5) Sulfur dioxide (SO2) 0.23 1.0 Other 5.) Nitrogen Oxides 2.44 10.7 Other (NOx) 6.) Carbon monoxide 6.96 30.5 Other (CO) 7.) Volatile organic 10.0 2.28 Other compounds (VOC) 8.) Lead (Pb) Neg Neg 9.) Total Hazardous Air 0.39 1.7 Pollutants (HAPs) AP-42 10.) Fluoride (F) 11.) Hydrogen Sulfide (H2S) 12.) Mercury (Hg) 13.) Total Reduced Sulfur (TRS) 14.) Sulfuric Acid Mist (SAM)

^{*}Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Pollutant Emissions Form (submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

			Effic	iency Standards			
		Pre-Controlled	Potential		Potential	Potential	
		Potential Emissions	to Emit		to Emit	to Emit	Basis for
		(tons/yr)	(PTE)	Units	(lbs/hr)	(tons/yr)	Determination
Pollutants:							
1.)	Formaldehyde				0.23	0.99	
2.)	Methanol				0.04	0.17	
3.)	Acetaldehyde				0.03	0.15	
4.)	Acrolein				0.03	0.14	
5.)							
6.)							
7.)							
8.)							

Greenhouse Gases (GHGs)

		Effic	ciency Standards	1		
	Pre-Controlled	Potential		Potential	Potential	
	Potential Emissions	to Emit		to Emit	to Emit	Basis for
	(tons/yr)	(PTE)	Units	(lbs/hr)	(tons/yr)	Determination
Pollutants:				***************************************	-	-
1.)						
2.)						
3.)						
4.)						
5.)						
6.)						
7.)						
8.)						

Release Point Information:

Complete the table below for *each* release point. Please include release point information for each emission unit. Multiple attachments may be necessary. A release point is a point at which emissions from an emission unit are released into the ambient (outside)air. List each individual release point on a separate pair of lines (release point ID and description). For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)

St	Stack Release Point Information						
Company Release Point ID:	Release Point Type: Vertical						
E1	Release Point Easting:	ー 607486.5					
	Release Point Northing:	4700387.2					
Company Release Point Description:	Base Elevation (ft): 7241						
Natural gas-fired compressor engine #1	Stack Height (ft): 26.25						
(4874)	Stack Diameter (ft): 0.833						
	Exit Gas Velocity (ft/s):	94.35					
	Exit Gas Temp (F): 912						
	Exit Gas Flow Rate (acfm):	3087.6					
Company Release Point ID:	Release Point Type: Vertical						
E2	Release Point Easting:	607490.8					
	Release Point Northing:	4700368.7					
Company Release Point Description:	Base Elevation (ft): 7241						
Natural gas-fired compressor engine #2	Stack Height (ft): 26.25						
(4875)	Stack Diameter (ft): 0.833						
	Exit Gas Velocity (ft/s):	94.35					
	Exit Gas Temp (F): 912						
	Exit Gas Flow Rate (acfm):	3087.6					
Company Release Point ID:	Release Point Type: Vertical						
H1	Release Point Easting:	607511.4					
	Release Point Northing:	4700408					
Company Release Point Description:	Base Elevation (ft): 7241						
Indirect Heater #1	Stack Height (ft): 12						
	Stack Diameter (ft): 0.5						
	Exit Gas Velocity (ft/s):	54.89					
	Exit Gas Temp (F): 601						
	Exit Gas Flow Rate (acfm):	646.7					
Company Release Point ID:	Release Point Type: Vertical						
H2	Release Point Easting:	607512.7					
	Release Point Northing:	4700408					
Company Release Point Description:	Base Elevation (ft): 7241						
Indirect Heater #2	Stack Height (ft): 12						
	Stack Diameter (ft): 0.5						
	Exit Gas Velocity (ft/s):	54.89					
	Exit Gas Temp (F): 601						
	Exit Gas Flow Rate (acfm):	646.7					

Complete the table below for each fugitive (area, volume, line) release point. List each individual release point on a separate line.

Fil	gitive Release Point Information
	The state of the s
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
	Release Height (ft):
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
	Release Height (ft):
Company Release Point Description:	
Company Palaces Paint ID.	
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
	Release Height (ft):
Company Release Point Description:	
*	
Company Release Point ID:	Release Point Latitude:
company Neicase Forners.	
	Release Point Longitude:
	Release Height (ft):
Company Release Point Description:	

Control Equipment:

Catalytic NOx Control Technology

Manufacturer:	DCL International, Inc.		Date Installed:	TBD
Model Name and			Company Control	
Number:	TBD		Equipment ID:	CE1
Company Control Equi	pment			
Description:	NSCR Catalys	t		
Pollutant(s) Controlled	l: 🗸 CO 🔽	NOx Pb	S02 VO	C PM
☐ PM (FIL)	PM Condensible	PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10 ☐ PM 2.5
Other				
			_	
NOTE: The following	fields require numeric val	ues unless otherwis	e denoted with an ast	erisk*
Design Control Efficier	ncy (%):	Capture Ef	ficiency (%):	
Operating Control Effic	ciency (%):			
Catalytic Reduction Ty	/pe:* Nonsele	ective Catalytic	1	
Reagent Type:			-	
Reagent Injection Rate	e- specify units:			
Reagent Slip Concentr	ation (ppbv):			
Reagent Slip Concentr	ation % O2:			
Inlet Gas Flow Rate (ad	ofm):			
Inlet Gas Temp (F):		Outlet Gas	Temp (F):	
Air Fuel Ratio Controll	ler:* Yes			
✓ This is the	only control equipment or	n this air contaminan	nt source	
If not, this control equ	ipment is:	Primary	Secondary	Parallel
List all other emission	units that are also			
vented to this control	equipment:* N	/A		
List all release point II	Os associated with this E1	1	The second secon	
control equipment:*				

Control Equipment:

Catalytic NOx Control Technology

Manufacturer:	DCL International,	Inc.		Date Installed:	TBD
Model Name and				Company Control	
Number:	TBD			Equipment ID:	CE2
Company Control Equi	ipment				
Description:	NSCR C	Catalyst			
Pollutant(s) Controlled	d: ☑ CO	✓ NO	Ox Db	□ SO2	OC PM
☐ PM (FIL)	☐ PM Condens	sible 🗌	PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10 ☐ PM 2.5
Other					
				_	
NOTE: The following	fields require nume	eric values	unless otherwi	se denoted with an a	sterisk*
Design Control Efficier	ncy (%):		Capture E	Efficiency (%):	
Operating Control Effic	ciency (%):				
Catalytic Reduction Ty	/pe:*	Vonselectiv	e Catalytic		
Reagent Type:					
Reagent Injection Rate	e- specify units:				
Reagent Slip Concentr	ation (ppbv):				
Reagent Slip Concentr	ation % O2:	***************************************			
Inlet Gas Flow Rate (ac	cfm):		100000000000000000000000000000000000000		
Inlet Gas Temp (F):			Outlet Ga	is Temp (F):	
Air Fuel Ratio Control	ler:* Yes				
✓ This is the	only control equipn	nent on thi	is air contamina	int source	
If not, this control equ	ipment is:		Primary	Secondary	Parallel
List all other emission	units that are also				
vented to this control	equipment:*	N/A			
List all release point II	Os associated with	this E2			
control equipment:*					



April 29, 2015

Air Quality NSR Program
Wyoming Department of Environmental Quality
Air Quality Division
Herschler Building, 2-E
122 West 25th Street
Cheyenne, WY 82002

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18.2.2. A.	APR 2015	
(27.23%	RECEIVED	000
SE SE	ELLIGICIALSIS	Z

Reviewer AmB	_
cc:	
Modeler	_
D.E	_
File <u>40009472</u> IMP FID <u>4527</u>	-
IMP FID 452'/	_

RE: Jonah Energy LLC

Request for C6 S2 Air Permit Application

Compressor Engine To Be Located at SHB 13-26 Production Facility

Sublette County, Wyoming

Dear WDEQ:

Jonah Energy LLC is submitting this letter along with the attached air permit forms and associated emissions to the Wyoming Department of Environmental Quality (WDEQ) Air Quality Division (AQD) to request the installation and operation of one (1) compressor engine associated with a line pressure reduction project in the Jonah field of operations. This application is being submitted following the in-person meeting between Jonah Energy LLC and the WDEQ-AQD that occurred on September 26, 2014 with Mr. Cole Anderson, Mr. Andrew Keyfauver and Mr. Josh Nall, and on April 6, 2015 with Mr. Todd Parfait and Mr. Steve Dietrich, along with subsequent phone conversations with the WDEQ-AQD.

Jonah Energy is requesting that the WDEQ issue a C6 S2 air permit for the permanent installation of one (1) compressor engine as part of a line pressure reduction project to determine if a decrease in line pressure will result in an increase in production along with a decrease in emissions in the Jonah field. If successful, the decrease in emissions would be a result of the reduced line pressure minimizing tank flash emissions within the Jonah field. The line pressure reduction project would consist of installing a horizontal separator, up to two (2) low pressure separators and associated heaters and a compressor engine for a maximum of 8760 hours of operation.

Currently, the one (1) compressor engine and associated separator heaters that would be installed at the Stud Horse Butte (SHB) 2-34 production facility have not yet been ordered; therefore, engine-specific information is not yet available at this time. The compressor engine that would be installed at the SHB 13-26 production facility would either be a natural gas-fired four-stroke lean-burn (4SLB) engine or a natural gas-fired four-stroke rich-burn (4SRB) engine with a maximum nameplate horsepower (HP) of 1850 HP. The two (2) separator heaters associated with the line pressure reduction project each have a maximum rating of 1.0 MMBtu/hr heat input. Jonah Energy is requesting to operate the compressor engine and separator heaters up to 8760 hours per year.

Since the compressor engine that would be installed at the SHB 13-26 production facility would likely be a rental unit, Jonah Energy would like the WDEQ-AQD to note that under current circumstances the make/model of engine to be installed will be directly related to the particular engine that is available by the specified rental company at the time the engine is procured. Since Jonah Energy has not chosen a specified engine vendor, Jonah Energy would like to request the flexibility of installing a range of make/model engines. Whichever compressor engine is eventually chosen to be installed at the SHB 13-26 production facility, it would continue to remain less than the maximum nameplate horsepower that would be permitted under this application.

The associated WDEQ-AQD permit application forms, emission calculations and supporting documentation are included with the permit application submittal.

Jonah Energy LLC SHB 13-26 Production Facility Compressor Engine – Line Pressure Reduction Project Page 2

Chapter 6, Section 2(c)(ii) Offset Demonstration

In a letter dated July 21, 2008, the WDEQ issued an interim policy on demonstration of compliance with Wyoming Air Quality Standards and Regulations Chapter 6, Section 2(c)(ii) for sources in Sublette County. This interim policy requires air permit applications for new or modified emission sources of NO_X and/or VOC to be accompanied by a demonstration that the proposed facility will not prevent the attainment or maintenance of an ambient air quality standard. One option for such demonstration includes emission reductions for NO_X and/or VOC emissions. Emissions reductions that may be used as offsets include activities that result in NO_X and/or VOC emissions reductions within Sublette County, such as projects that result in a change of operation that occur after April 1, 2008.

An analysis of the NO_x and VOC emissions and offsets, if necessary, for the SHB 13-26 compressor engine are identified in **Table 1**.

Table 1
Offset Emissions Analysis – SHB 13-26 Compressor Engine

Facility Emissions	NO _X (tpy)	VOC (tpy)
Emissions Resulting After Compressor Engine and Separator Heater Installation	9.8	12.6
Proposed Emissions Increase/(Decrease) From Proposed Modification	9.8	12.6
Offset Ratio	1.1:1	1.5:1
Emissions Required to be Offset	10.8	18.9

As the emissions resulting from the project will result in a minimal increase of NO_X and VOC, it can be presumed that the compressor engine addition to the SHB 13-26 facility will not cause further impairment to ambient air quality due to the overall reduction of Jonah Energy's emissions from other permitting actions. Jonah Energy requests that the WDEQ offset the NO_X and VOC emissions from the compressor engine installation from Jonah Energy's offset bank. Jonah Energy understands that they have enough NO_X and VOC emission credits available to offset the emissions identified in Table 1. We understand that this project will satisfy the WDEQ's Chapter 6, Section 2(c)(ii) interim permitting policy for sources in Sublette County.

WDEQ permit application forms are included as **Attachment A**, supporting emission calculations are included as **Attachment B**, and a current copy of Jonah Energy's offset bank spreadsheet is included as **Attachment C**. One original signed copy is enclosed, along with a CD that includes the electronic copies of the application forms and associated emissions calculations for the SHB 13-26 compressor engine as part of the line pressure reduction project.

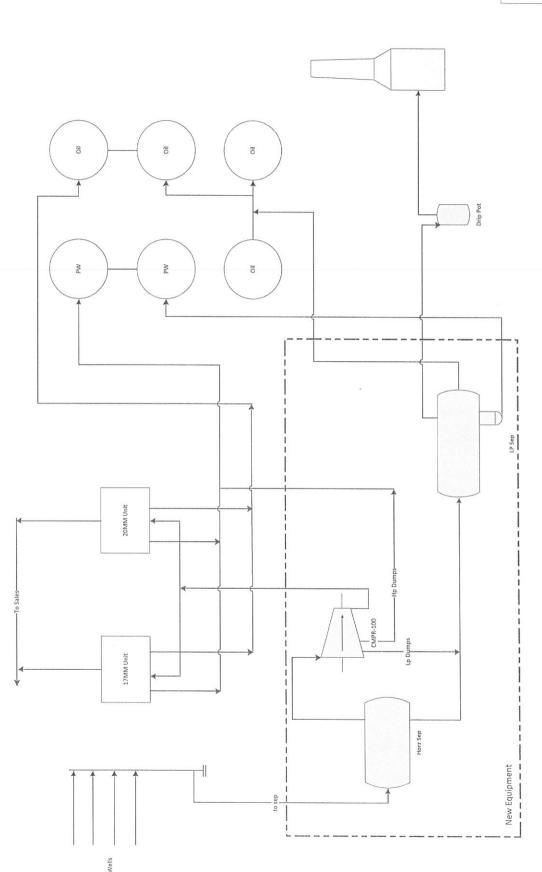
If you have any questions in regards to this application submittal, please contact me at 720.577.1251 or via email at chuck.cornell@jonahenergy.com.

Sincerely,

Sr. Regulatory Lead

Charles Cornel

Compressor Pilot PFD



Legend
3 - Phase
6 Gas
Condensate
Water

ATTACHMENT A WYOMING PERMIT APPLICATION FORMS



Air Quality Division

New Source Review Permit Application Form

Is this an addendum to an existing application of Application: 4/29/2015 Previous Application #: COMPANY INFORMATION: Jonah Energy LLC Company Name: Address: 707 17th Street, Suite 2700 City: Denver State: Colorado Zip Code: 80202 Country: USA Phone Number: 720.577.1000 **FACILITY INFORMATION:** Facility Name: SHB 13-26 Compressor Engine New Facility or Existing Facility: New Facility Description: Compressor Engine - Line Pressure Reduction Project Facility Class: Minor Operating Status: Not Yet Installed Facility Type: **Production Site** For Oil & Gas Production Sites ONLY: First Date of Production (FDOP)/Date of Modification: N/A Does production at this facility contain H2S?* No *If yes, contact the Division. API Number(s): NAICS Code: 211111 Crude Petroleum and Natural Gas Extraction **FACILITY LOCATION:** *Enter the facility location in either the latitude/longitude area or section/township/range area. Both are not required. Physical Address: City: WY State: County OR Latitude: 42.44618 Longitude: -109.69178 County: Sublette Quarter Quarter: SW Quarter: SW Township: Section: 26 29N Range: 108W For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789) CONTACT INFORMATION:

Title: Mr.	First Name		Charles			
Last Name:	Cornell					
Company Name:			Jonah Ener	gy LLC		
Job Title:		Sr.	Regulatory Lea	d		
Address:	707 17th Street, Suite 2700					
City:)enver	State:	ate: Colorado		orado	
Zip Code: 80202						
Primary Phone No.:	720.577.1251		E-mail:		chuck.cornell@jonahenergy	.com
Mobile Phone No.:	970.988.6067		Fax No.:			
Contact Type:	Environmental contact	7	Start Date:	October 6.	2014	

Additional Contact Type (if needed):	NSR Permitting	contact	
Title: First Na			
Last Name:			
Company Name:		•	
Job Title:			
Address:			
City:	State:		
Zip Code:			-
Primary Phone No.:		E-mail:	
Mobile Phone No.:		Fax No.:	
Contact Type:		Start Date:	
FACILITY APPLICATION INFORM	MATION:		
General Info:			
Has the facility changed location or is it	a new/ greenfield fac	ility?	No
Has a Land Use Planning document bee			No
Is the facility located in a sage grouse co			No
If the facility is in a sage grouse core are	ea, what is the WER nu	umber?	
* For questions about sage grouse core			
Federal Rules Applicability - Fa	cility Level:		
Prevention of Significant Deterioration			No
Non-Attainment New Source Review:	** == ***		No
Modeling Section:			
Has the Air Quality Division been contact	cted to determine if m	nodeling is required?	Yes
Is a modeling analysis part of this applic			No
Is the proposed project subject to Preve	ention of Significant D	eterioration (PSD) requirements?	No
Has the Air Quality Division been notifie	ed to schedule a pre-a	pplication meeting?	No
Has a modeling protocol been submitte			No
Has the Air Quality Division received a C			
the need for an AQRV analysis?			No
Required Attachments:			
Facility Map	\checkmark		
Process Flow Diagram	✓		
Modeling Analysis (if applicable)			
Land Use Planning Document			
Detailed Project Description	7		
Emissions Calculations	abla		
I,Char	les Cornell	Sr. Regula	tory Lead
Responsible Of	fficial (Printed Name)		
an Official Representative of the Compa	any, state that I have I	knowledge of the facts herein set fort	h and that the same
are true and correct to the best of my \boldsymbol{k}	nowledge and belief.	I further certify that the operational	information provided
and emission rates listed on this applica	ation reflect the antici	pated emissions due to the operation	of this facility. The
facility will operate in compliance with	all applicable Wyomir	ng Air Quality Standards and Regulation	ons.
	1		1 1
/ /	// 1		
	1/1		e: 4/29/2015
Signature: / July W	wu	Date	e: // [(/ (/ ())
(ink)			/ /

Engine

Company Equipment ID:	E1				
Company Equipment Descripti	on:	Natural gas-fir	ed compressor e	ngine	
Operating Status: Not Yet	Installed				
Initial Construction Commence	ement Date:		TBD		
Initial Operation Commenceme	ent Date:		TBD		_
Most Recent Construction/ Mo	odification				
Commencement Date:			TBD		
Most Recent Operation Comm	encement Date:	0	TBD		
Select reason(s) for this emiss	ions unit being in	cluded in this	application (mus	t be complete	ed regardless of date of
installation or modification):					
Reason: Constru	uction (Greenfield	/New Facility)			
If reason is <i>Reconstruction</i> or	Temporary Permi	it or Other, pl	ease explain belo	w:	
		, 1	20		
Name Plate Rating: 1850			Units:	hp	
Site Rating: <1850			Units:	hp	
Primary Fuel Type: Field Ga	as		011101	1.16	
Secondary Fuel Type:					
Model Name and Number:	TBD				
	roke Rich Burn				
Serial Number Tracking Table:	one men barr	_			
Serial Number: TBD			Order D	ate.	TBD
Manufacturer Name:	TBD		Order B	acc.	100
Construction/Installation Com		: TE	.D		
Operation Commencement/ St		. <u> </u>			
Manufacture Date: TBD	tare ap bate.	-12			
Btu Content: 1120			Units:		
Fuel Sulfur Content: Neg			Units:		
Type of Service: Compre	ossion	T	Offics.		
Is diesel engine EPA Tier Certif		*	f yes, list EPA Tie	. Datina	
is dieser engine EFA Her Certif	ieu:		i yes, list EPA He	r Kating	-
SCC Codes, List all Source Class	sification Codo(s)	/CCC/ +l+ -l			O 0 0
SCC Codes: List all Source Class	sincation code(s)	(SCC) that desc	cribe the process(es) performe	d by the emission source
(e.g., 1-02-002-04).					
Determinations of Cl. 1.1	D				
Potential Operating Schedule		operating sched	lule for this emis	sion unit.	
Hours/day:	24				
Hours/year:	8760				

Control Equipment:
Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit? Ves No Pollutant:
Proposed BACT:
*If yes, attach BACT Analysis with this application.
Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit? Yes No Pollutant:
Proposed LAER:
*If yes, attach LAER Analysis with this application.
Federal and State Rule Applicability: New Source Performance Standards (NSPS): Subject to subpart New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources. NSPS Subpart: Potentially NSPS JJJJ, depending on manufacture date
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected
National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride). Part 61 NESHAP Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63 Part 63 NESHAP Subpart: Potentially MACT ZZZZ, depending on manufacture date
Prevention of Significant Deterioration (PSD): Not Affected These rules are found under WAQSR Chapter 6, Section 4.
Non-Attainment New Source Review: Not Affected These rules are found under WAQSR Chapter 6, Section 13.

Engine

Company Equipment ID:	
Company Equipment Description:	Natural gas-fired compressor engine
On anating Status	
Operating Status: Not Yet Installed	TDD
Initial Construction Commencement Date:	TBD
Initial Operation Commencement Date:	TBD
Most Recent Construction/ Modification	TOD
Commencement Date:	TBD
Most Recent Operation Commencement Dat	e: TBD
	g included in this application (must be completed regardless of date of
installation or modification):	s included in this application (must be completed regardless of date of
Reason: Construction (Greenfi	eld/New Facility
Reason. Construction (dreem)	eld/New Facility)
If we are in Beautation on Tananaum Ba	weit an Other share some in believe
If reason is <i>Reconstruction</i> or <i>Temporary Pe</i>	rmit or Other, please explain below:
Name Plate Rating: 1850	Units: hp
Site Rating: <1850	Units: hp
Primary Fuel Type: Field Gas	
Secondary Fuel Type:	
Model Name and Number: TBD	
Engine Type: 4 Stroke Lean Burr	
Serial Number Tracking Table:	
Serial Number: TBD	Order Date: TBD
Manufacturer Name: TBD	
Construction/Installation Commencement Da	ate: TBD
Operation Commencement/ Start-up Date:	TBD
Manufacture Date: TBD	
Btu Content: 1120	Units:
Fuel Sulfur Content: Neg	Units:
Type of Service: Compression	
Is diesel engine EPA Tier Certified?	* If yes, list EPA Tier Rating
_	
SCC Codes: List all Source Classification Code	(s) (SCC) that describe the process(es) performed by the emission source
(e.g., 1-02-002-04).	(-) ()
(6.8.) 2 02 002 0 1).	
Potential Operating Schedule: Provide th	ne operating schedule for this emission unit.
Hours/day: 24	to operating schedule for this emission will.
Hours/year: 8760	

Control Equipment:
If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.
Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit? Yes No Pollutant:
Proposed BACT:
*If yes, attach BACT Analysis with this application.
Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit? Yes No Pollutant:
Proposed LAER:
*If yes, attach LAER Analysis with this application.
Federal and State Rule Applicability:
New Source Performance Standards (NSPS): Subject to subpart
New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.
NSPS Subpart: Potentially NSPS JJJJ, depending on manufacture date
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected
National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride). Part 61 NESHAP Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63
Part 63 NESHAP Subpart: Potentially MACT ZZZZ, depending on manufacture date
Prevention of Significant Deterioration (PSD): Not Affected
These rules are found under WAQSR Chapter 6, Section 4.
Non-Attainment New Source Review: Not Affected These rules are found under WAQSR Chapter 6, Section 13.

Heater/Chiller

Company Equipment ID: H1	
Company Equipment Description:	Indirect Heater #1 - 1.0 MMBtu/hr unit
Operating Status: Not yet installed	
Initial Construction Commencement Date:	TBD
Initial Operation Commencement Date:	TBD
Most Recent Construction/ Modification	
Commencement Date:	TBD
Most Recent Operation Commencement Date:	TBD
Select reason(s) for this emissions unit being in	ncluded in this application (must be completed regardless of date
of installation or modification):	
Reason: Construction (Greenfie	eld/New Facility)
If reason is <i>Reconstruction</i> or <i>Temporary Perm</i>	nit or Other, please explain below:
Firing Type: Indirect Heat Input Rating: 1.0 Primary Fuel Type: Field Gas Secondary Fuel Type: Heat Content of Fuel: 1120	Units: MMBtu/hr Units: BTU/scf
Fuel Sulfur Content: Neg	Units:
SCC Codes: List all Source Classification Code(s) source (e.g., 1-02-002-04).	(SCC) that describe the process(es) performed by the emission 2310021100
Potential Operating Schedule: Provide the	e operating schedule for this emission unit.
Hours/day: 24	
Hours/year: 8760	

Control Equipment: No If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.
if yes, pieuse fill out and attach the appropriate Control Device and Release Point Information worksneets.
Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit? Yes No Pollutant:
Proposed BACT:
*If yes, attach BACT Analysis with this application.
Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit? Yes No Pollutant:
Proposed LAER:
*If yes, attach LAER Analysis with this application.
Federal and State Rule Applicability: New Source Performance Standards (NSPS): New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources. NSPS Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected
National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride). Part 61 NESHAP Subpart:
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63 Part 63 NESHAP Subpart:
Prevention of Significant Deterioration (PSD): Not Affected These rules are found under WAQSR Chapter 6, Section 4.
Non-Attainment New Source Review: Not Affected These rules are found under WAOSE Chapter 6. Section 13.

Heater/Chiller

Company Equipment ID: H2	
Company Equipment Description:	Indirect Heater #2 - 1.0 MMBtu/hr unit
Operating Status: Not yet installe	d
Initial Construction Commencement Da	te: TBD
Initial Operation Commencement Date:	TBD
Most Recent Construction/ Modification	1
Commencement Date:	TBD
Most Recent Operation Commencemen	t Date:
Select reason(s) for this emissions unit	being included in this application (must be completed regardless of date
of installation or modification):	
Reason: Construction (C	Greenfield/New Facility)
If reason is <i>Reconstruction</i> or <i>Tempora</i>	ry Permit or Other, please explain below:
Firing Type: Indirect	
Heat Input Rating: 1.0	Units: MMBtu/hr
Primary Fuel Type: Field Gas	**************************************
Secondary Fuel Type:	
Heat Content of Fuel: 1120	Units: BTU/scf
Fuel Sulfur Content: Neg	Units:
SCC Codes: List all Source Classification	Code(s) (SCC) that describe the process(es) performed by the emission
source (e.g., 1-02-002-04).	
	2310021100
Potential Operating Schedule: Pro	vide the operating schedule for this emission unit.
Hours/day: 24	
Hours/year: 876	50
#	

Control Equipment: No	
If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.	
Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?	
☐ Yes ✓ No	
Pollutant:	
Proposed BACT:	
*If yes, attach BACT Analysis with this application.	
Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?	
☐ Yes ✓ No	
Pollutant:	
Proposed LAER:	
*If yes, attach LAER Analysis with this application.	
Federal and State Rule Applicability:	
New Source Performance Standards (NSPS): Not Affected	
New Source Performance Standard are listed under 40 CFR 60-	
Standards of Performance for New Stationary Sources.	
NSPS Subpart:	
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected	_
National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).	
Part 61 NESHAP Subpart:	
- Tare of NESTIAL Subpare.	
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected	
National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)	
standards are listed under 40 CFR 63	
Part 63 NESHAP Subpart:	
Prevention of Significant Deterioration (PSD): Not Affected	
These rules are found under WAQSR Chapter 6, Section 4.	
Non-Attainment New Source Review: Not Affected	
These rules are found under WAOSP Chapter 6, Section 12	

Emissions Information- The following tables request information needed to determine the applicable requirements

and the compliance status of this emission unit with those requirements.

			Effic	iency Standards			
		Pre-Controlled Potential Emissions (tons/year)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/year)	Basis for Determination
iteria Po	llutants:					Annual Control of the	
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)				0.38	1.67	AP-42
2.)	PM #10 microns in diameter (PE/PM10)				0.38	1.67	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)				0.38	1.67	AP-42
	Sulfur dioxide (SO2)				0.27	1.16	Other
5.)	Nitrogen Oxides (NOx)				2.24	9.79	Other
6.)	Carbon monoxide (CO)				6.28	27.52	Other
7.)	Volatile organic compounds (VOC)				2.87	12.55	Other
	Lead (Pb)				Neg	Neg	
9.)	Total Hazardous Air Pollutants (HAPs)				0.36	2.85	AP-42
	Fluoride (F)				N/A	N/A	
	Hydrogen Sulfide (H2S)				N/A	N/A	
12.)	Mercury (Hg)				N/A	N/A	
13.)	Total Reduced Sulfur (TRS)				N/A	N/A	
14.)	Sulfuric Acid Mist (SAM)				N/A	N/A	

^{*}Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

		Efficien	cy Standards			
	Pre-Controlled	Potential		Potential	Potential to	
	Potential Emissions	to Emit		to Emit	Emit	Basis for
	(tons/year)	(PTE)	Units	(lbs/hr)	(tons/year)	Determination
ollutants:						
1.) Formaldehyde				0.29	1.25	
2.) Acetaldehyde				0.16	0.69	
3.) Acrolein				0.1	0.42	
4.)						
5.)						
6.)						

Greenhouse Gases (GHGs)

		Effic	iency Standards	1		
	Pre-Controlled	Potential		Potential	Potential to	
	Potential Emissions	to Emit		to Emit	Emit	Basis for
	(tons/yr)	(PTE)	Units	(lbs/hr)	(tons/yr)	Determination
Pollutants:						
1.)						
2.)						
3.)						
4.)						
5.)						
6.)						

Control Equipment:

Oxidation Catalyst

Manufacturer:	TBD			Date Installed:	TBD	
Model Name and				Company Control		
Number:	TBD			Equipment ID:		
Company Control Equ	ipment					
Description:	Oxidation	catalyst	t with AFRC			
Pollutant(s) Controlle		□ NC		□ SO2	C PN	1
☐ PM (FIL)	PM Condensible		PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PN	/I 10 ☐ PM 2.5
☐ Other						
NOTE: The following	fields require numeric	values	unless otherwi	se denoted with an ast	erisk*	
Design Control Efficie	ncy (%):		Capture E	fficiency (%):		
Operating Control Eff	iciency (%):					
Catalyst Type:*	Oxidation Catalyst		Air Fuel R	atio Controller:*	Yes	
✓ This is the	only control equipment	t on thi	s air contamina	nt source		
If not, this control equ	uipment is:		Primary	Secondary		Parallel
List all other emission	n units that are also					
vented to this contro	l equipment:*	N/A				
List all release point I	Ds associated with this	Manual				
control equipment:*		E1				
					and the same of th	

Control Equipment:

Catalytic NOx Control Technology

Manufacturer:	TBD				Date Instal	led:	TBD		
Model Name and					Company C	Control			
Number:	TBD				Equipment	ID:	E1-con	trol	
Company Control Equi	ipment								
Description:		NSCR with	AFRC						
Pollutant(s) Controlled	d:	☑ CO	✓ NC	Ox Pb	SO2	✓ VO	C PM	1	
PM (FIL)	PM (Condensible		PM 10 (FIL)	☐ PM 2.	5 (FIL)	☐ PN	1 10	☐ PM 2.5
Other									
		V							
NOTE: The following	fields requi	re numeric v	values	unless otherwis	se denoted v	ith an aste	erisk*		
Design Control Efficier	ncy (%):			Capture E	fficiency (%):				
Operating Control Effi	ciency (%):								
Catalytic Reduction Ty	ype:*	Nons	selectiv	e Catalytic					
Reagent Type:	4								
Reagent Injection Rate	e- specify ur	nits:							
Reagent Slip Concentr	ation (ppbv):							
Reagent Slip Concentr	ation % O2:					•			
Inlet Gas Flow Rate (ac	cfm):					-			
Inlet Gas Temp (F):				Outlet Ga	s Temp (F):				
Air Fuel Ratio Control	ler:*	Yes]						
✓ This is the	only contro	equipment	t on thi	s air contamina	nt source				
If not, this control equ	ipment is:			Primary	Seco	ndary		Para	allel
List all other emission	units that	are also							
vented to this control	equipment	*	N/A						
List all release point II	Ds associate	ed with this		20					
control equipment:*			E1						

Release Point Information:

Complete the table below for *each* release point. Please include release point information for each emission unit. Multiple attachments may be necessary. A release point is a point at which emissions from an emission unit are released into the ambient (outside)air. List each individual release point on a separate pair of lines (release point ID and description). For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)

St	ack Release Point Information
Company Release Point ID:	Release Point Type: Vertical
E1-stack	Release Point Latitude: 42.44618
	Release Point Longitude: -109.69178
Company Release Point Description:	Base Elevation (ft): 7224
Compressor engine exhaust stack	Stack Height (ft): 1.5X bldg height
	Stack Diameter (ft): TBD
	Exit Gas Velocity (ft/s): #VALUE!
	Exit Gas Temp (F): >500
	Exit Gas Flow Rate (acfm): TBD
Company Release Point ID:	Release Point Type:
	Release Point Latitude:
	Release Point Longitude:
Company Release Point Description:	Base Elevation (ft):
	Stack Height (ft):
	Stack Diameter (ft):
	Exit Gas Velocity (ft/s):
	Exit Gas Temp (F):
	Exit Gas Flow Rate (acfm):
Company Release Point ID:	Release Point Type:
	Release Point Latitude:
	Release Point Longitude:
Company Release Point Description:	Base Elevation (ft):
	Stack Height (ft):
	Stack Diameter (ft):
	Exit Gas Velocity (ft/s):
	Exit Gas Temp (F):
	Exit Gas Flow Rate (acfm):
Company Release Point ID:	Release Point Type:
	Release Point Latitude:
	Release Point Longitude:
Company Release Point Description:	Base Elevation (ft):
	Stack Height (ft):
	Stack Diameter (ft):
	Exit Gas Velocity (ft/s):
	Exit Gas Temp (F):
	Exit Gas Flow Rate (acfm):

Complete the table below for each fugitive (area, volume, line) release point. List each individual release point on a separate line.

Fugit	ive Release Point Information
Company Release Point ID: Company Release Point Description:	Release Point Latitude: Release Point Longitude: Release Height (ft):
Company Release Point ID:	Release Point Latitude: Release Point Longitude: Release Height (ft):
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude: Release Point Longitude: Release Height (ft):
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude: Release Point Longitude: Release Height (ft):
Company Release Point Description:	

ATTACHMENT B SUPPORTING EMISSION CALCULATIONS

Summary of Critiera Pollutant Emissions SHB 13-26 Compressor Engine Jonah Energy LLC

		N	NOX		00	V	VOC	SC	SO2	PM10 /	PM10 / PM2.5
Unit ID	Source	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
E1	Natural gas-fired Lean-Burn Compressor Engine, 1850 HP	2.04	8.93	4.08	17.86	2.85	12.50	0.24	1.05	0.19	0.82
E1	Natural gas-fired Rich-Burn Compressor Engine, 1850 HP	2.04	8.93	6.12	26.80	2.85	12.50	0.24	1.05	0.37	1.60
H	Natural gas-fired separator heater #1, 1.0 MMBtu/hr	0.10	0.43	0.08	0.36	0.005	0.02	0.01	90.0	0.007	0.03
H2	Natural gas-fired separator heater #2, 1.0 MMBtu/hr	0.10	0.43	0.08	0.36	0.005	0.02	0.01	90.0	0.007	0.03
を の	Totals - With Lean-Burn Engine	2.24	9.79	4.24	18.59	2.87	12.55	0.27	1.16	0.20	0.89
Strategic Street, Street, St.	Totals - With Rich-Burn Engine	2.24	9.79	6.28	27.52	2.87	12.55	0.27	1.16	0.38	1.67

Notes: (1) Engine and heater emissions are based upon a maximum of 8760 operating hours

CALCULATIONS AND COMPUTATIONS

Emission Source:	Compressor Engine
Source Type:	Natural Gas-Fired RICE - Rich Burn
Site-Rated Horsepower (HP)	1850 Max Permitted Horsepower
Maximum Fuel Usage (Btu/bhp-hr)	10182 Manf Spec Sheet, HHV
Number of Units:	1
Natural Gas Heating Value (BTU/scf)	1120 Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05 Estimated
Operating Hours per Year:	8760

One (1) Compressor Engine

	Emission	Emiss	ion Rate
Compound	Factor (a)	Hourly (b)	Annual (c)
		(Lbs/Hr)	(Tons/Year)
NOx	0.5	2.04	8.93
CO	1.5	6.12	26.80
VOC	0.7	2.85	12.50
HCHO	0.05	0.20	0.89
S02	0.013	0.24	1.05
PM-10 - total	0.02	0.37	1.60

Notes:

- (a) Emission factors for NOx, CO, VOC and HCHO (g/hp-hr) based upon proposed WDEQ BACT limits
 Emission factor for SO2 (lb/MMBtu) based maximum estimated sulfur content of natural gas of 5 grains/100 scf
 PM10 emission factor (lb/MMBtu) from USEPA AP-42, Chapter 3.2, Table 3.2-3 (4SRB), dated July 2000.
 PM10 emission factor includes PM10 filterable and PM condensable
 (b) Hourly Emission Rate (Lbs/Hr) = (Emission Factor, g/hp-hr) * (Horsepower, HP) / 453.6
 Hourly Emission Rate (Lbs/Hr) = (Emission Factor, lb/MMBtu) * (Horsepower, HP) * (Fuel Consumption, Btu/bhp-hr) / 1,000,000
 (c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

CALCULATIONS AND COMPUTATIONS

Emission Source:	Compressor Engine
Source Type:	Natural Gas-Fired RICE - Lean Burn
Site-Rated Horsepower (HP)	1850 Max Permitted Horsepower
Maximum Fuel Usage (Btu/bhp-hr)	10182 Manf Spec Sheet, HHV
Number of Units:	1
Natural Gas Heating Value (BTU/scf)	1120 Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05 Estimated
Operating Hours per Year:	8760

One (1) Compressor Engine

UI OI	ie (i) Compressor	Liigine	
	Emission	Emiss	ion Rate
Compound	Factor (a)	Hourly (b)	Annual (c)
		(Lbs/Hr)	(Tons/Year)
NOx	0.5	2.04	8.93
CO	1.0	4.08	17.86
VOC	0.7	2.85	12.50
НСНО	0.07	0.29	1.25
S02	0.013	0.24	1.05
PM-10 - total	0.01	0.19	0.82

- Notes:

 (a) Emission factors for NOx, CO, VOC and HCHO (g/hp-hr) based upon proposed WDEQ BACT limits

 Emission factor for SO2 (lb/MMBtu) based maximum estimated sulfur content of natural gas of 5 grains/100 scf
 PM10 emission factor (lb/MMBtu) from USEPA AP-42, Chapter 3.2, Table 3.2-2 (4SLB), dated July 2000.
 - (b) Hourly Emission Rate (Lbs/Hr) = (Emission Factor, g/hp-hr) * (Horsepower, HP) / 453.6

 Hourly Emission Rate (Lbs/Hr) = (Emission Factor, lb/MMBtu) * (Horsepower, HP) * (Fuel Consumption, Btu/bhp-hr) / 1,000,000

 (c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

CALCULATIONS AND COMPUTATIONS

Emission Source:	Separator Heaters	
Source Type:	Natural Gas-Fired Heaters	
Heat Input (mmBtu/hr):	1.00 Permitted heat input	
Number of Units:	2	
Natural Gas Consumption (MMscf/yr)	7.8 calculated; one heater	
Natural Gas Consumption (MMscf/yr)	15.6 calculated; 2 heaters	
Natural Gas Heating Value (BTU/scf)	1120 Analysis Data	
Sulfur Content of Fuel (grains/scf):	0.05 Estimated	
Operating Hours per Year:	8760	

One Separator Heater

	One Separator II	eatei	
	Emission	Emiss	ion Rate
Compound	Factor (a)	Hourly (b)	Annual (c)
		(Lbs/Hr)	(Tons/Year)
NOx	100	0.10	0.43
CO	84	0.08	0.36
VOC	5.5	0.005	0.02
S02	1.27E-02	0.01	0.06
PM-10	7.60	0.007	0.03

Two Separator Heaters

	TWO Separator He	Baleis	
	Emission	Emiss	ion Rate
Compound	Factor (a)	Hourly (b)	Annual (c)
8		(Lbs/Hr)	(Tons/Year)
NOx	100	0.20	0.86
CO	84	0.16	0.72
VOC	5.5	0.01	0.05
S02	1.27E-02	0.03	0.11
PM-10	7.60	0.01	0.07

Notes:

- (a) Emission factors (lb/MMscf) based on USEPA AP-42, Chapter 1.4, Tables 1.4-1 and 1.4-2, dated July 1998, except for SO2 Emission factor for SO2 (lb/MMBtu) based assumed sulfur content of natural gas
- (b) Hourly Emission Rate (Lbs/Hr) except for SO2 = (Emission Factor, Ib/MMscf) * (Heat Input, MMBtu/hr) *

 (Actual Natural Gas Heating Value, Btu/scf) / (AP-42 Natural Gas Heating Value, Btu/scf) / (AP-42 Natural Gas Heating Value, Btu/scf)

 (b) Hourly Emission Rate (Lbs/Hr) for SO2 = (Emission Factor, Lb/MMBtu) * (Heat Input, MMBtu/hr)

 (c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

Calculations and Computations

							Ī T					
					Natural Gas	Combustion	Natur	ral Gas-Fired	Compressor	Engine Emis:	sions	
Pollutant	Type ^(a)		Emission Factor		Maximum Heat Input,	Average Heat Input,		Emission Rate, One Engine			on Rate, ingines	Major
			3.2, 7/00 - Natural (ing Engines - Rich (lb/MMBtu) ^(d)		one (MMBtu/Hr) ^(b)	engine (MMBtu/Hr) ^(c)	Hourly ^(e) (lb/hr)	Annual (Ibs/yr)	Annual th (tpy)	Hourly ^(e) (lb/hr)	Annual ⁽¹⁾ (tpy)	(Y/N)
1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,3-Butadiene 1,3-Butadiene 1,3-Dichloropropene Acetaldehyde Acrolein Benzene Carbon Tetrachloride Chlorobenzene Chloroform Ethylene Dibromide Formaldehyde Methanol Methylene Chloride Naphthalene PAH Styrene Toluene Inlyl Chloride Kylene	HAP HAP HAP HAP HAP HAP HAP HAP HAP HAP	0.05	2.53E-05 1.53E-05 6.63E-04 1.27E-05 2.79E-03 2.63E-03 1.77E-05 1.29E-05 1.37E-05 2.48E-05 2.13E-05 3.06E-03 4.12E-05 9.71E-05 1.41E-04 1.19E-05 5.58E-04 7.18E-06		18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84	18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84 18.84	4.77E-04 2.88E-04 1.25E-02 2.39E-04 5.26E-02 4.95E-02 2.98E-02 2.43E-04 2.58E-04 4.67E-04 4.01E-04 2.04E-01 5.76E-02 1.83E-03 2.66E-03 2.24E-04 1.55E-02 1.35E-04 3.67E-03	4.2 2.5 109.4 2.1 460.4 434.0 260.7 2.9 2.1 2.3 4.1 3.5 1786.4 504.9 6.8 16.0 23.3 2.0 92.1 1.2 32.2	2.09E-03 1.26E-03 5.47E-02 1.05E-03 2.30E-01 1.17E-01 1.30E-01 1.46E-03 1.13E-03 2.05E-03 1.76E-03 8.93E-01 2.52E-01 3.40E-03 8.01E-03 1.16E-02 9.82E-04 4.60E-02 5.92E-04	4.77E-04 2.88E-04 1.25E-02 2.39E-04 5.26E-02 4.95E-02 2.98E-02 3.33E-04 2.43E-04 4.67E-04 4.01E-04 2.04E-01 5.76E-02 7.76E-04 1.83E-03 2.66E-03 2.24E-04 1.05E-02 1.35E-04 3.67E-03	2.09E-03 1.26E-03 5.47E-02 1.05E-03 2.30E-01 1.37E-01 1.30E-01 1.46E-03 1.05E-03 2.05E-03 8.93E-01 2.52E-01 3.40E-03 8.01E-03 1.16E-02 9.82E-04 1.61E-02	No N
Number Fuel Co	f Operation of Engines Horsepower onsumption Heat Input Efficiency =	1 1,850 10,182 18.84	hours/yr HP Btu/bhp-hr MMBtu/hr Assume 0% for c	alcs	C	Compressor Engli Maximum li	0.43 ne Total HAPs ndividual HAP	3753.0	1.88		1.88	No No

- Notes:

 (a) Type = HAP for Hazardous Air Pollutant.

 (b) Maximum heat input rate for the temporary compressor engine is based on calculated heat input rate of 18.84 MMBtu/hr

 (c) Assume average heat input rate is the same as maximum heat input rate.

 (d) Emission factors from AP-42, Section 3.2, Tables 3.2-3 for 4SRB engines except formaldehyde. Formaldehyde factor based on WDEQ BACT

 (e) Hourly Emission Rate (lb/hr) = [Heat Input Rate (MMBtu/Hr) * Emission Factor (lb/MMBtu)]

 (f) Annual Emission Rate (tpy) = (Average Hourly Emission Rate, lb/hr) * (8760 hr/yr) / (2,000 lb/ton)

Calculations and Computations

Pollutant Type Pactor		,				Natural Gas	Combustion	Natur	al Gas-Fired	Compressor	Engine Emiss	sions	
AP-42 Section 3.2, 700 Natural Gas-Fired Reciprocating Engines - Lean Burn (ghthp-tr) (Inshimating) Rating (Inshimating) Hourty Rating (Inshimating) Hourty Rating (Inshimating) Rating (Inshi	Pollutant	Type(a)											Major
Reciprocating Englows - Lawn Burn (gibhp-in) (loMMBullin) Rating (MMBullin) (lobin)	Politiani	Type		ractor		Heat Input,	Heat Input,		One Engine		One E	ngines	
1,2-Tetrachroreshane			and the second s	The state of the s	ACTION OF THE PARTY OF	one	engine						
1,1,2,2-Tetrachioroethane					1		I (e)			Annual ^(f)	************	Annual ⁽¹⁾	
1.4.2-Ticholoroethane			(g/bhp-hr)	(lb/MMBtu)(=)	Rating	(MMBtu/Hr)(a)	(MMBtu/Hr) ^(c)	(lb/hr)	(lbs/yr)	(tpy)	(lb/hr)	(tpy)	(Y/N)
1,2-Tinchloroethane	1.2.2-Tetrachloroethane	HAP		4 00F-05	F	18.84	18.84	7.53E-04	6.6	3 30E 03	7 525 04	2 205 02	
3-Butadiene						3(55.53)							
3-Dichioropropene													
Methynaphthalene						0.000.000							
1.2.4-Trimethylpentane		100000000000000000000000000000000000000				307773390	100000000000000000000000000000000000000						No
Neanaphthene		400000000000000000000000000000000000000				1,717.00	10000 10000						No
Neangaiphtylene HAP						177773							No
April		100000000000000000000000000000000000000				0.515.00	1000000000						No
Acrolein HAP 5.14E-03 A 18.84 18.84 9.8EE-02 848.1 4.24E-01 9.8EE-02 4.24E-01 N 8 8 8 9 8 8 2 9 1						. 050.500	10167500						No
Benzene						1882 St. 1982	100000000						No
Benzo(phythoranthene HAP													No
Benzo(gh)yrene HAP												3.63E-02	No
Petroz(e)pyrene HAP						100000000			0.0		3.13E-06	1.37E-05	No
Petrog(pt, h)perylene HAP	Benzo(e)pyrene	HAP		4.15E-07	D	18.84	18.84	7.82E-06	0.1	3.42E-05	7.82E-06	3.42E-05	No
Sipheny HAP	Benzo(g,h,i)perylene	HAP		4.14E-07	D	18.84	18.84	7.80E-06	0.1	3.42E-05	7.80E-06	3.42E-05	No
Compressor Engine HAP	Biphenyl	HAP		2.12E-04	D	18.84	18.84	3.99E-03	35.0	1.75E-02	3.99E-03		No
Chlorobarzene	Carbon Tetrachloride	HAP		3.67E-05	E	18.84	18.84						No
Shortform	Chlorobenzene	HAP		3.04E-05		18.84							No
Chrysene HAP 6,93E-07 C 18.84 18.84 1.31E-05 0.1 5.72E-05 N 1.31E-05 N	Chloroform	HAP		2 85F-05					7.00				
Ethylbenzene HAP 3.97E-05 B 18.84 18.84 7.48E-04 6.6 3.28E-03 7.48E-04 3.28E-03 No. St. Properties of the properties of													
Ethylene Dibromide HAP		0.5000000000000000000000000000000000000											No
HAP							100000000000000000000000000000000000000						No
HAP													No
HAP 0.07 18.84 18.84 2.85E-01 2500.9 1.25E+00 2.85E-01 1.25E+00 Note that the state of th						1-1-1							No
Methanol HAP			0.07	5.67E-06			(0)(0)(0)(0)						No
Methylene Chloride HAP 2.00E-05 C 18.84 18.84 3.77E-04 3.3 1.65E-03 3.77E-04 1.65E-03 NP-Hexane HAP 1.11E-03 C 18.84 18.84 2.09E-02 183.2 9.16E-02 2.09E-02 9.16E-02 NR-Hexane HAP 7.44E-05 C 18.84 18.84 1.40E-03 12.3 6.14E-03 1.40E-03 6.14E-03 NR-Hexane PAH HAP 2.69E-05 D 18.84 18.84 1.40E-04 1.7 8.58E-04 1.96E-04 NR-Hexane Name of Carbon of Carbo			0.07	0.505.00									No
1.11E-03 C 18.84 18.84 2.09E-02 183.2 9.16E-02 2.09E-02 9.16E-02 Naphthalene HAP 7.44E-05 C 18.84 18.84 1.40E-03 12.3 6.14E-03 1.40E-03 6.14E-03 Naphthalene HAP 2.69E-05 D 18.84 18.84 1.40E-03 12.3 6.14E-03 1.40E-03 6.14E-03 Naphthalene HAP 2.69E-05 D 18.84 18.84 1.96E-04 1.7 8.59E-04 1.96E-04 2.22E-03 Naphthalene HAP 1.36E-06 C 18.84 18.84 2.56E-05 0.2 1.12E-04 2.56E-05 1.12E-04 Naphthalene HAP 2.36E-05 E 18.84 18.84 2.56E-05 0.2 1.12E-04 2.56E-05 1.12E-04 Naphthalene HAP 2.36E-05 E 18.84 18.84 4.45E-04 3.9 1.95E-03 4.45E-04 1.95E-03 Naphthalene HAP 2.48E-06 D 18.84 18.84 4.67E-05 0.4 2.05E-04 4.67E-05 0.50E-04							1000000					2.06E-01	No
Naphthalene												1.65E-03	No
PAH HAP 2.69E-05 D 18.84 19.84 5.07E-04 4.4 2.22E-03 5.07E-04 8.58E-04 N 1.04E-05 D 18.84 18.84 1.96E-04 1.7 8.58E-04 1.96E-04 N 1.36E-06 C 18.84 18.84 2.56E-05 0.2 1.12E-04 2.56E-05 1.12E-04 N 1.36E-06 D 18.84 18.84 1.96E-04 3.9 1.95E-03 4.45E-04 1.96E-05 N 1.96E-03 N 1.96E-03 N 1.96E-03 N 1.96E-03 N 1.96E-03 N 1.96E-04 N 1.96E-05 N 1.96E								2.09E-02	183.2	9.16E-02	2.09E-02	9.16E-02	No
Phenanthrene						18.84	18.84	1.40E-03	12.3	6.14E-03	1.40E-03	6.14E-03	No
Phenanthrene							18.84	5.07E-04	4.4	2.22E-03	5.07E-04	2.22E-03	No
Pyrene HAP 1.36E-06 C 18.84 18.84 2.56E-05 0.2 1.12E-04 2.56E-05 1.12E-04 1.95E-03 1.95E-03 1.95E-03 1.95E-03 N.95E-03 N						18.84	18.84	1.96E-04	1.7	8.58E-04	1.96E-04		No
Styrene	Pyrene	HAP		1.36E-06	C	18.84	18.84	2.56E-05	0.2	1.12E-04			No
Tetrachloroethane	Styrene	HAP		2.36E-05	E	18.84	18.84	4.45E-04					No
Toluene HAP 4.08E-04 B 18.84 19.84 7.69E-03 67.3 3.37E-02 7.69E-03 3.37E-02 No. 1.49E-05 C 18.84 18.84 2.81E-04 2.5 1.23E-03 2.81E-04 1.23E-03 No. 1.52E-02 No. 1	etrachloroethane	HAP		2.48E-06	D	18.84	18.84						No
HAP	oluene	HAP			В								No
HAP						5000 NOOCO							No
Hours of Operation 8,760 hours/yr Number of Engines 1 Horsepower 1,850 HP Fuel Consumption 10,182 Btu/bhp-hr Compressor Engine Total HAPs 2.85 2.85 N Heat Input 18.84 MMBtu/hr Maximum Individual HAP 1.25 1.25 N	(ylene	HAP		1.84E-04	В	18.84	100000000000000000000000000000000000000						No.
Hours of Operation 8,760 hours/yr Number of Engines 1 Horsepower 1,850 HP Fuel Consumption 10,182 Btu/bhp-hr Compressor Engine Total HAPs 2.85 2.85 N Heat Input 18.84 MMBtu/hr Maximum Individual HAP 1.25 1.25 N									5007 /				
Number of Engines 1 Horsepower 1,850 HP Fuel Consumption 10,182 Btu/bhp-hr Compressor Engine Total HAPs 2.85 Heat Input 18.84 MMBtu/hr Maximum Individual HAP 1.25 1.25								0.65	5697.4	1			
Horsepower				hours/yr									
Fuel Consumption													
Heat Input 18.84 MMBtu/hr Maximum Individual HAP 1.25 1.25 N			1,850	HP									1
Heat Input 18.84 MMBtu/hr Maximum Individual HAP 1.25 1.25 N	Fuel Co	onsumption	10,182	Btu/bhp-hr		C	compressor Engir	ne Total HAPs		2.85		2.85	No
1.20		Heat Input	18.84	MMBtu/hr									
							Maximum Ir	ndividual HAP		1.25		1.25	No
NSCR Control Efficiency = 0.0% Assume 0% for calcs	NSCR Control I	- fficiency	0.534	A	alaa								

Notes:

(a) Type = HAP for Hazardous Air Pollutant.

(b) Maximum heat input rate for the temporary compressor engine is based on calculated heat input rate of 18.84 MMBtu/hr

(c) Assume average heat input rate is the same as maximum heat input rate.

(d) Emission factors from AP-42, Section 3.2, Tables 3.2-2 for 4SLB engines except formaldehyde. Formaldehyde factor based on WDEQ BACT

(e) Hourly Emission Rate (lb/hr) = [Heat Input Rate (MMBtu/Hr) * Emission Factor (lb/MMBtu)]

(f) Annual Emission Rate (tpy) = (Average Hourly Emission Rate, lb/hr) * (8760 hr/yr) / (2,000 lb/ton)

ATTACHMENT C JONAH ENERGY OFFSET BANK SPREADSHEET

							SUBLETTE CO	COUNTY PERMITTED EMISSIONS April 1, 2008 - PRESENT	EMISSIONS	April 1, 200	18 - PRESEN	Т						
	Date of Public	-			1	Darrolle Murrohan	G three	JOHAnnazza	No.	April 1, 2008 E	Base Emission missions	Previous Permit	Т	_	Officet VOC	Officer NOv	Transle WOC for M	
The continue of the continue	Notice	Application Date	Application number		Applica					voc		_		_				
CONTINUENTIAL CONTINUE		9/16/2008	7855	Entlenta	Stud Horse Butte 10-28 CF	MD-7855		23.3	4.6	77.4	2.5	0 0	-54.1	2.1	-54.1	2.1	na	this permit is already (saued so no NDx offsets are required
4000000000000000000000000000000000000	4/17/2008	3/14/2008	7519	Estana	SAG34-19	CF-7519	4/1/2009	12.8	6.0	10,6	9,0	0 0	2.2	03	2.2	6.3	yes	
	6/26/2008	2/13/2000 & H/13/2000 5/7/2008	19228	Fraction	Stud Horse Butte 6-28 CF	MD-7761	4/1/2009	14.2	2.2	6.4	1.3	0	7.8	6.0	7.8	6.0	sad.	
	6/12/2008	4/22/2008	3002	Frechts	Stud Horse Rutte 7-15 CF	MD-7692	4/1/2000	183	3.8	8.5	2,3	0	9,8	2	9.6	1.5	yes	Annual emissions reduction due to employee vehicle traffic of 13.0 tov
The continue The	9/22/2008	6/17/2008	7985	PaCana	Jonah Workforce Facility	MD-7905	4/22/2009	14.3	11.5	5.6	+	1	+	-1.5	5.1	-15		NO., 60 6 tpy CO, 9.2 tpy VOC, and 196 1 tpy PM.
	1/8/2809	6/25/2008	7975	EnCana	Corona - SIB 15-19 CF	MD-7975	4/1/2009	29.3	6.5	81.7		-		4.8	+52.4	4.8	yes	accition of a existing weeks that had no derly/tank construis and a well with no deby controls.
CONTINUE	1/8/2009	5/16/2008	7807	Enchia	Stud Horse Butte 32-10	CT-1076	4/1/2009	5.1	2.3	6.9	1.5	0 0	0.2	0 80	9.2	0 0	OH N	
	1/8/2009	6/18/2008	7924	EnCana	Jonah Federal 1-5 CF	MD-7924	4/1/2009	13.8	3.9	25.4	2.8	0	-11.6	1.1	-11.6	1.1	yes	controlling pneumatic pumps
	1/11/2009	6/25/2008	7972	Freama	Jonah Federal 5-4 CF	MD-7972	4/1/2009	28.2	6,3	19.5	2.5	0 0	8.7	3.8	6.7	3.0	sak	
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	1/8/2009	9087/57/9	1973	F-05.36914	501,7-36	LI-1773	11/2003	/4	1.2	2 00	-	-	-	117	4.7	1.2	G.	consolidating wells and controlling previously uncontrolled tanks
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	1/8/2009	4245/2008	7974	Encana	Stud Horse Butte 12-36 CF	MD-7974	4/1/2009	1.82	3.4	12.3	+	+	+	5.4	-623	2 =	yes	and dehydration units
1,000,000,000,000,000,000,000,000,000,0	1/10/2009	1007/0/71	7083	Chartes	Stud merse matter / 1-32 t.r.	MINATURA	41/2000				-		-	100	/"		yes	sound forteen a locareace in VOC if measurable minute meets controlled
1000 1000 <th< td=""><td>1/8/2009</td><td>12/27/2007</td><td>7162</td><td>Pytamen</td><td>Stud Horse Butte 40-16</td><td>CT-7162</td><td>4/1/2009</td><td>11</td><td>970</td><td></td><td></td><td></td><td></td><td>0</td><td>0</td><td>0</td><td>yes</td><td>women nave a necrease in vol. ii preminanc pumps were controlled (modified prior to 9/1/07 so control is not required)</td></th<>	1/8/2009	12/27/2007	7162	Pytamen	Stud Horse Butte 40-16	CT-7162	4/1/2009	11	970					0	0	0	yes	women nave a necrease in vol. ii preminanc pumps were controlled (modified prior to 9/1/07 so control is not required)
1979/1970/1970 1979/1970/1970/1970 1979/1970/1970/1970/1970/1970/1970/1970/		12/5/2007	7056	Epi anu	Stud Horse Butte 16-26 CF	MD-7056	4/1/2009	16.7	1.6	15.7				0.1	1.0	0.1	sak	would have a decrease in VOC if pneumatic pumps were controlled
1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,000,000 1,000,000,0											+	-	+					(modified prior to 9/1/07 so control is not required)
4.00 1.00 <th< td=""><td>1/8/2009</td><td>7/13/2007 & B/13/200H 7/10/200H</td><td>8035</td><td>EMURIA</td><td>Corona - SHB 10-31 CF</td><td>MD-8035</td><td>4/1/2009</td><td>29.3</td><td>979</td><td>89.8</td><td>4,2</td><td>0 0</td><td>-60.5</td><td>2,6</td><td>5,05-</td><td>2.6</td><td>yes</td><td>addition of 3 existing wells that had no deby or tank con-</td></th<>	1/8/2009	7/13/2007 & B/13/200H 7/10/200H	8035	EMURIA	Corona - SHB 10-31 CF	MD-8035	4/1/2009	29.3	979	89.8	4,2	0 0	-60.5	2,6	5,05-	2.6	yes	addition of 3 existing wells that had no deby or tank con-
1967/100 1971	8/28/2008	7/29/2008	8095	EnChua	Yellow Point 4-12 CF	MD-8095	9/30/2008	31.9	4.4	219		-		-113	-187.1	-11.3		consolidation of 29 wells which decreases the number of dehydration units / tanks now controlled at 2 of the existing wells /
1,00,000 1,0					and the second second	TO THE STATE OF	diago, et e	3 144	27	250	-		101			,		pacimatic pumps now controlled
The column	1/4/2009	7/24/2004	8109	Esk ana	Corona 3-31 CF	MD-H109	4/1/2009	20.1	3.6	20,9			8'0*	2,6	8'0-	2.6	yes	SOUTHLY WELL TO LET THAT THE VEHICLES
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	1/8/2009	7/28/2008	8110	Profestion	Stud Horse Butte 11-26 CF	MD-8110	4/1/2009	35.1	8.8	18.2	+	1	+	6.7	16.9	6.7	yes	
4000000000000000000000000000000000000	1/8/2009	8/12/2008	8202	Frecana	Stud Horse Butte 11-17 CF	MD-8202	4/1/2009	30.5	6.1	57.1		1	1	4.4	-26.6	4.8	yes	decrease due to consolidation of previously uncontrolled equipment
WYMANING 6100 CALLES MATERIAL STATES CALLES CALLES <t< td=""><td></td><td>9/18/2008</td><td>8132</td><td>Englenn</td><td>Section 32 Methanol Tank</td><td>ww-H132</td><td>9/18/2008</td><td>0.3</td><td>0</td><td>0</td><td>+</td><td></td><td>0.3</td><td>0 !</td><td>6.0</td><td>0</td><td></td><td></td></t<>		9/18/2008	8132	Englenn	Section 32 Methanol Tank	ww-H132	9/18/2008	0.3	0	0	+		0.3	0 !	6.0	0		
Mathematic Mat	1/8/2009	9/4/2008	8326	EnGana	onah Federal 1-6 CF	MD-8326	4/1/2009	22.7	5.2	45.6		1	-22.9	1.8	-22.9	2	sak	decrease due to consolidation of previously uncontrolled equipment
	1/8/2009	9/15/2008	8357	ENCARA Enchasa	Yellow Point 2-1 CF Stud Horse Butte 10-33 CF	MD-8357	4/1/2009	18.1	4.9	25	5,4	0 0	-4.2	2.4	-4.2	2.6	yes	controlling pneumatic pumps / less beaters
	1/8/2009	10/15/2008	8489	EnCana	501, 2-2 CF	CT-8489	4/1/2009	4.3	6.0	0	0	0 0	43	6'0	6.5	1	sak	
1,000,000,000,000,000,000,000,000,000,0	V V	H/13/2008	7438	Pottana	Stud Horse Butte 16-34R CF	MD-7184	5/2/2008	19.4	4	7.7	1.5	0	11.7	2.5	17.8	2.8	yes	short form application
40,700mm 61 cm	VV	11/13/2008	6758	Follows	Stud Horse Butte 4-26 CF	MD-6758	5/2/2008	36.1	8.2	22	2.6	0 0	14.1	9.0	21.2	6.2	sak	short form application
100000000 600000 600000 600000 600000 600000 600000	1/8/2009	9/22/2008	8440	For latte	Corona-SIII 10-30 CF	MD-8440	4/1/2009	27.3	H.3	77.5			-50.2	5.7	-50.2	CA	yes	consolidating wells and controlling previously uncontrolled tanks
This continue		***************************************	0.444	1000	27 20 11 attent account hours	MP-DAG	47173000	10.5	4.1	569	-		.44	2.5	44.0	2.8	Mes	consolidating wells and controlling previously uncontrolled tanks
4000000000000000000000000000000000000	1/4/2009	10/2/2008	19458	Spi-384	Tonah Federal 1-B CF	MD-BASB	4/1/2009	14.4	2.9	23.9	+		56-	2.6	-9.5	2.9	yes	Controlling proviously uncontrolled well
10.100 10.00 <t< td=""><td>1/8/2009</td><td>10/8/2008</td><td>8467</td><td>ENCARS</td><td>Stud Horse Butte 7-36 CF</td><td>MD-8467</td><td>4/1/2089</td><td>15.7</td><td>2.9</td><td>43.8</td><td></td><td></td><td>-28.1</td><td>2</td><td>-28.1</td><td>2.2</td><td>sak</td><td>convolidating wells and controlling proviously uncontrolled tanks and delystration units</td></t<>	1/8/2009	10/8/2008	8467	ENCARS	Stud Horse Butte 7-36 CF	MD-8467	4/1/2089	15.7	2.9	43.8			-28.1	2	-28.1	2.2	sak	convolidating wells and controlling proviously uncontrolled tanks and delystration units
This continue	District of a	District Section	0400	Kint June	Stud Borse Butte 11-20 CE	MD-8490	4/1/2009	35.6	8.9	144.4			-108.8	1.8	-108.8	2.0	yes	convolidating wells and controlling previously uncontrolled tanks
1,11,11,11,11, 1,1	17877000	10/16/2008	8498	FoCana	Stud Horse flutte 16-18 CF	MD-8498	4/1/2009	9.4	2.6	20			-10.6	2.2	-10.6	2.4	yes	controlling previously uncontrolled deby/tank emissions
1,11,11,11,11,11,11,11,11,11,11,11,11,1	1/8/2009	10/28/2008	9366	Paterina	Stud Horse Butte 122-10 CF	MD-8566	4/1/2009	18.2	3.7	16.4	6.4	0 0	11.6	33	17.4	3.1	yes	
1907-1904 Control Ling Control Ling 11 (17) (17) (17) 12 (17) (17) (17) 12 (17) (17) (17) 12 (17) (17) (17) (17) 12 (17) (17) (17) (17) 12 (17) (17) (17) (17) (17) (17) (17) (17)	1/8/2009	11/12/2008	1564	Not and	Lowel Office Building	Ww-7561	10/27/2008	15	1	0				-0,1	17	-0.1	ou	new facility, relinquishing authority to operate engines authorized
14/10/2007 14/10/2	× × ×	3/10/2009	4633A	Ent.ana	Section 36 Water Disposal	CT-4633A	3/30/2009	1.1	2.7	0.0				0.0	0.0	0.0	ho	Engine Swap
11/1/19/2019 11/1/19/2019<	NA						4/1/2009			1	+	+	+		76.9	-76.9		Short form application no change in emission from
13.17.12.0. 13.17.12.0.	NA	2/20/2009	9058	Kedana	Stud Horse Butte 13-26 CF	MD-8200	4/29/2009	31.8	7.6	0.0	-	1	-	0.0	0'0	0.0	VV.	AP-0200
1,11/2, 1,11	NA	3/4/2009	9004	EnCana	Corona-SHB 10-31 CF	MD-8035	10/26/2009	335	7.1	0.0	l	-	4.2	1 0	0.0	90	S S	short form application no change in emisson from
1,11,12,120 1,11,12,120	N/A	3/19/2009	1816	Entanta	Corona Stud Horse Bulle 10-30	MP-840	10/26/2009	7.8	2.0	870	-	1	3.1	8.0	4.7	6.0	VV	AP-B440 Short Form
Triggion	VV	5/22/2009	9450	ERGADA	Stud Horse Butte 3-27 CF	MD-7696	10/26/2009	24.9	4.8	104.5			9.67-	2,8	9.67-	3.1	VX 2	Chart Form
This control This	NA	7/1/2009	9655	Encana	Stud Horse Butte 15-19 CF	MD-7975	8/24/2009	11.0	2.6	0.0			-18.3	-3.9	-183	-3.9	NA	Permitting Actual Production instead of PTE-Short Forw
40000000 1000000 1000000 1000000 1000000 1000000 1000000 10000000 1000000 10000000 1000000 10000000 10000000 10000000 10000000 10000000 10000000 10000000 10000000 1000000 100000000 100000000 10000000000 100000000000 100000000000 1000000000000 10000000000000 100000000000000 100000000000000000 1000000000000000000000000000000000000	NA NA	8/10/2009	9772	Euclana	Yellow Point 1-13 CF	MD-7164	8/24/2009	8.4	2.2	0.0				-2.3	-14,0	-2.3	V.V.	Short Form Application- Permitting at Actual production in- PTE
Tright T	N.A.	8/20/2009	9800	ENCARIA	Stud Horse Butte 4-26 CF	MD-6758	10/26/2009	27.5	879	0.0		-		2.0	-8.6	0.8	₹ _N	Short Form Application- Permitting at Actual Instead of Pra-
	9/25/2009	9/17/2009	8122	KhCarta	Drill Rig Fleet	CT-8122	1/4/2010	0.67	282.0	97.1	457.1	0 0	-18.1	-175.1	-18,1	-175.1	NA	Drill Rig Fleet
11/20/2019 10/27 11/20/2019 10/27 11/20/2019	10/2/2009	11/17/2008	B649	FaCasa	Holmes State 1-36	CI-8649	1/19/2010	EH1	3.0	19.0	H		H	2.4	-0.7	2.6	×	Controlling Pneumatic pumps that did not requrit controls as of
1/11/12/12/12/12/12/12/12/12/12/12/12/12	10/2/2009	11/26/2008	1691	Reference	Cabrico 7-30 CF	T CORRECTION	orași fer fr				+	-	+	-	336.	01	* Z	consolidating wells and controlling previously uncontrolled
Table Tabl	10/2/2009	11/26/2008	9692	EnCana	Vellow Point 1-12 CF	MD-8692	0102/61/1	14.0	2.0	167	1	+	-1.9	13	-1.9	1.4	VN.	dehydration units and prinematics
Taylor T	1/8/2009	11/21/2008	8672	Fatana	Crimson State 12-36	CT-8672	1/19/2010	2.6	0.5	0.0			2.6	5.0	3.9	9.0	VN V	
1/2/1/2018 1/2/201	10/2/2009	12/1/20ан	H704	Follows	Jonah Federal 5-6 CF	MD-8704	1/19/2010	143	4.2	43.5	-		-29.2	2.8	-29.2	3.1	N.	consolidating wells and controlling previously uncontrolled tanks
1211/202044 11.5 15.5	10/2/2009	12/3/2008	8709	CHARMS	Colombia Maria 16-2	CT-8249	1/19/2010	3.0	6.5	0.0	-	l	3.0	0.5	4.5	9.0	NA	And the first of the state of t
12/17/2019 17/12/2019 17/	10/2/2009	12/10/2008	8750	End'anna	Yellow Point 1-34 CF	CT-8750	1/19/2010	2.9	0.5	0.0			2.9	6.5	4.4	9.0	NA	
1/27/2009 17/4 1/27/2009 1/2/4 1/27/2009 1/2/4 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/2009 1/2/4 1/2/2009 1/2/4 1/2/2009 1/2/	10/2/2009	12/9/2008	8744	EnCana	Cabrillo 13-30 CF	MD-8744	1/19/2010	43.2	8.6	77.5			-34.3	979	-34.3	7.3	VV	
1.2/15/12/2019 0.75 1.57 1.50 0.0 0.0 0.0 0.0 -0.13 0.0 -0.13 0.0 -0.13 0.0 -0.13 0.0 -0.13 0.0 -0.13 0.0 -0.13 0.0 -0.13 0.0 -0.13 0.0 0.0 -0.13 0.0 -0.13 0.0 0.0 -0.13 0.0 -0.13 0.0 0.0 0.0 0.0 -0.13 0.0 <td>10/2/2009</td> <td>1/29/2009</td> <td>8748</td> <td>flwCatta hoat'assa</td> <td>Crimson Federal 16-14 Stod Horse Butte 11,22 CF</td> <td>CT-8748 MD-7348</td> <td>1/19/2010</td> <td>31.9</td> <td>9.9</td> <td>12.6</td> <td></td> <td></td> <td>19.3</td> <td>3.4</td> <td>19.3</td> <td>3.4</td> <td>NA</td> <td></td>	10/2/2009	1/29/2009	8748	flwCatta hoat'assa	Crimson Federal 16-14 Stod Horse Butte 11,22 CF	CT-8748 MD-7348	1/19/2010	31.9	9.9	12.6			19.3	3.4	19.3	3.4	NA	
12/15/2009 17/15	10/3/2003	12/11/2008	8760	EnCana	Stud Horse Butte 3-36 CF	MD-8760	1/13/2010	20.6	4.1	64.1			-43.5	6.0	43.5	1.0	NA	consolidating wells and controlling praviously uncontrolled tanks and delival-atton units
1211/2001 1979 PH-2111 [Herendo-17A CT-075] [172/2010 44 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	10/9/2000	12/15/2008	8766	Enclaris	Stud Horse Butte 11-34 CF	MD-8766	1/13/2010	17.8	3.7	5.09			-42.7	1.4	-42.7	1.5	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
	10/1/2009	12/11/2008	8758	Hudana	Hactenda 6-17A	CT-8758	1/13/2010	4.4	2'0	0.0			4.4	0.7	9'9	9.0	NA	

dehydration antis and mucmatics	consolidating wells and controlling previously uncontrolled dehydration units and minematics	consolidating wells and controling previously uncontrolled dehydration units and powematics	consolidating wells and controlling previously uncontrolled dehydration units and pnue mattes	consolidating wells and controlling previously uncontrolled	dehydration units and prograaties consolidating wells and controlling previously uncontrolled	dehydration units and pnucmatics			controlling previously uncontrolled tanks and dehydration units	consolidating wells and controlling previously uncontrolled	consolidating wells and controlling previously uncontrolled	dehydration units and pruematics		concalidation wells and controlline manifester manufactor	dehydration units, processits, and tanks				Promonent and from the characteristics for manufactural trans	Decrease due to decrease in production	Controlled Preumatic Pumps	Addition of three engines - Volvo Penta TAAD741GE	MORITY WATER HAMILING PARTY	Short Form, permitting at actual production instead of Maximum	Short Form		Short Form	Short Form	Short Form		Short Form	Classe Borns	Short Form		Adding 2 methanol tanks, 3 TEG tanks and 2 PG tanks	Short Form	consolidation- Flash emissions and pneumatic pumps now controlled	Shart Form	Short Form		Short Form	Manual December of Manual States of Manu	Short Form	Convolidation	Short Form	Replaced 3406 engines with a 34121A from Section 30			Adding generator engine		Short Form	Short Form	Short Form	Short Form	Short Form	Consolidation	Convolidation	TO DEPOSITOR OF THE PARTY OF TH
VV	NA	NA	NA	NA NA	NA.	VV	NA	VV	VV :	NA NA		NA	NA	NA	NA	NA NA	VV	VV	NA NA	NA	VZ :	NA	NA	NA	NA	NA	NA	NA	NA	NA NA	NA	NA	VV	NA	NA	NA	NA	NA	VV	NA	NA	VN	NA	NA NA	NA	NA	NA		NA	V N	NA	V V	VV	NA	NA	NA NA	VV.	NA.
3.6	3.1	3.5	-0.5	0.7	0.0	0.7	4.6	0.7	17	0.8		-4.6	9.0	6.0	0.4	4.8	1.5	0.2	0.7	-1.1	1.7	9,0	7.3	-0,8	0.4	1.2	-4.8	-2.3	-1.0	1.4	-0.6	0.4	-3.6	6.0	0,0	-1.2	-0.3	0.3	970	0.3	1.3	2.0	-1.8	1.2	8.0	-3.8	3.9		9.0	0.2	-0.8	-3.8	-0.4	-0.2	1.5	-1.2	8'9-	-3.9
3.9	-69.2	-14.7	0.061-	6.9	4116	5.9	31.1	9'9	-1.8	-1.5		-42.4	1.2	3.9	-29.1	7.1	19.4	7.7	2.1	-2.6	-15	6.3	27.3	4.6-	0.3	-2.4	-20,6	-13.9	-10.8	978	6.9-	-8.7	-19.6	-8.7	0.3	-5,8	-32.2	0.4	9.9	9.0	-1.5	0.3	-17.1	-28.5	-0.4	-1.0	58-		0.3	-4.5	-0.5	-22.8	-12.9	-5.6	4.5	-5.6	-101.0	-66.1
3.3	2.8	3.2	-0.5	970	0.7	9'0	4.2	970	3.7	5.0		9.4.6	0.5	8.0	6.4	2.0	1.4	0.2	9,0	-1.1	1.5	50	6.6	8'0-	0.4	11	-4,8	-2.3	-1.0	1.3	-0.6	9.0	-3.6	0.0	0.0	-1,2	-0.3	0.3	6.0	0.3	1.3	6.0	-1.8	1.1	8.0	-3.8	3.5		5.0	0.2	9.0-	-3.8	-0.4	-0.2	1.42	-1.2	-6.8	- 65-
2.6	-69.2	-14.7	-190.0	4,6	3116	3.9	20.7	4.4	-1.8	-1.5		-42.4	970	2,6	-20,1	4.9	12.9	5.1	1.4	-2.6	512	270	18.2	4.6-	0,2	-2.4	-20.6	-13.9	-10.8	4.4	6.9-	-5.8	-19.6	-8.7	0.2	-5.8	-32,2	0.3	4.4	0.4	-1.5	0.2	-17.1	-28.5	-0.4	-1.0	-8.3		0.2	54.5	-0.5	-22.8	-12.9	9'5'	3.0	-5.6	-101.0	-66.1
0.0	0.0	0.0	0.0	0.0	00	0.0	0	0	0	0		0	0	0	0	0 0	0	0	0	0	0	0.0	0	3.4	0	6.2	6.3	4.1	4.1	0	4.1	0 9	879	0	0	2.9	0	0 48	÷	0	60	3.4	0	0 2.4	43	979	0	200	0	9'0	2.3	8.9	6.2	0	3.7	2.6	0.0	000
0.0	0.0	0.0	0.0	0.0	00	0.0	0	0	0	0		0	0	0	q	22.7	q	0	0 0	0	g :	0.0	0	18.4	0	30.5	28.2	20.6	22.7	0 0	18.5	0 0	31.9	0 0	6.0	15.7	0	24.9	20.1	0	12.8	18.3	0	0 0	23	31.8	0	200	5.0	11	6'6	51.3	30.5	0	13.9	9.4	0.0	0.0
6.0	1.6	8.0	4.8	0.0	40	0.0	0,0	0.0	0.1	0.0		9.6	0.0	0,0	1.8	2.6	3.3	3.1	0.0	4.8	6.0	0.0	0.0	0.0	3,0	0.0	0.0	0.0	0.0	1.5	0,0	9.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0'0	0.0	4.3	2.5	0.0	0.0	0,5	n'a	0'0	0.0	0,0	0.0	0.0	1.9	9.0	0.0	10.4	7.0
16.7	92.3	34.8	213.0	0.0	12.3	0.0	0.0	0.0	17.9	11.4		615	0.0	0'0	36.4	14.0	5.8	7.5	0.0	16.5	10.9	0.0	0.0	0.0	9.4	0.0	0.0	0.0	0.0	4.5	0,0	9.1	0.0	19.5	0,0	0.0	41.8	0.0	0.0	0.0	0,0	0.0	29.4	52.5	0,0	0.0	21.9	0.0	0.0	0.0	0.0	0.0	0.0	13.5	13.9	0.0	115.3	82.7
3.7	4.4	4.0	4.3	970	11	970	4.2	9.0	3.8	2.3		5.0	0.5	9,0	2.2	4.6	4.7	3.3	9,0	3.7	5.4	50	979	2.6	3.4	7.3	1.5	1.8	3.1	2.8	3.5	1.2	3.2	1,3	0.0	1.7	1.6	0.3	4.7	0.3	2.2	4.1	253	3.6	5.1	3.6	4.0	3.0	5.0	9.0	2.6	5.1	5.8	1.7	1.8	1.4	3.6	3.1
19,3	23.1	20.1	23.0	4.6	6.3	3.9	20.7	4.4	16.1	66		19.1	0.8	2.6	7.3	18.9	18.7	12.6	1.4	13.9	9.4	0.2	18.2	0.6	9.6	28.1	7.6	6.7	11.9	8.9	11.6	3.3	123	10,8	0.5	9,9	9.6	E.0.	24.5	0.4	11.3	18.5	10.9	24.0	22.6	17.2	13.6	18.9	7.0	6.5	18.0	28.5	17.6	7.9	16.9	3.8	20.5	16.6
1/13/2010	1/13/2010	1/13/2010	1/13/2010	1/13/2010	1477/2010	1/13/2010	1/13/2010	1/13/2010	1/13/2010	1/13/2010		1/13/2010	1/14/2010	1/14/2010	1/14/2010	10/26/2009	1/14/2010	1/14/2010	1/14/2010	1/14/2010	1/14/2010	12/10/2009	3/23/2010	11/25/2009	11/25/2009	11/30/2009	12/11/2009	2/19/2010	2/19/2010	5/28/2010	1/4/2010	2/23/2010	2/25/2010	2/23/2010	3/17/2010	3/15/2010	6/2/2010	3/18/2010	4/22/2010	5/12/2010	5/27/2010	5/27/2010	7/29/2010	9/3/2010	8/16/2010	0.021 (2010	9/28/2010	6/20/2010		9/29/2010	12/22/2010	10/28/2010	11/5/2010	12/28/2010	12/29/2010	2/8/2011	3/4/2011	3/4/2011
MD-8820	MD-8776	MD-ma1	MD-8912	MD-8923	91000	MD-9065	WD-9059	MD-9070	MD-9149	MD-920II		MD-9253	CT-9283	CT-9354	MD-9351	MD-9455	MD-9456	MD-9476	CT-9500	MD-9654	MD-9903	MD-8553	MB-9725 CT-9983	MD-8199	MD-7179	MD-8202	CT-10149 MD-7972	8760	MD-8759	MD-10192	MD-8441	MD-10261	MD-7348	WV-10324 MD-10423	wv-10430	MD-9592 MD-8467	MD-10517	ww-10482	MD-8881	wv-10632	MD-10700	MD-7692	MD-10806	MIP-10925	MD-8912	CT-4903	MD-11015	MD-8110		C7-7162	MD-11150 MD-0216	MD-8490	MD-8776	MD-11248	MD-11249	MIN-11289	MD-11399 MD-11400	MD-11428
Stud Horse Butte 8-14 CF	Stud Horse Butte 12-29 CF	Stud Horse Butte 84-9 CF	Stud Horse Butte 1-29 CF	Crimson Federal 15-24	Mary Control	Colonian Sederal 10-36	Stud Horse Butte 48-22 CF	Crimson Unit 2-18	Stud Horse Butte 124-11 CF	Crimson Pederal 7-35 Stud flores flutte 1-34 CF	And the same as the same	Stud Horse Butte 1-27 CF	Cabrito 2-31 CF Crimson Unit 8-31	Haclenda 5-20	Stud Horse Butte 16-28/9-28	Stud Horse Butte 12-15 CF Stud Horse Butte 2-28 CF	Stud Horse Butte 15-28 CF	Yellow Point 10-14 CF	Crimson Federal 2-13	Cabrillo 8-25 CF	Stud Horse Butte 53-16 CF	Jonah Storage Yard Engines	SOL 95-18 Water Treatment Facility	Yellow Point B-13 CF	Stud Horse Butte 2-34 CF	Stud Horse Butte 11-17 CF	Cabrito 61-13 Ionali Federal 5-4 CF	Stud Horse Butte 3-36 CF	Stud Horse Butte 12-36 CF	Stud Horse Butte 7-22 CF	Stud Horse Butte 4-33 CF	Jonah Federal 3-5 CF	Stud Horse Butte 1-27 CF	Temporaty Off Storage Tanks Jonah Federal 4-18 CF	Section 32 Methanol Tank	Stud Horse Butte 07-36	Jonah Federal 01-04X CF	Stud Horse Butte 122-10WW	Stud Horse Butte D3-27 CF	Stud Horse Butte 4-36WW	Tot Federal #1	Stud Horse Butte 07-15	Section 36 Water Management Facility	Cabrito 13-19 CF	Stud Horse Butte 53-16 CF Stud Horse Butte 1-29 CF	SOI, 95-18 Water Treatment Facility	Stud Horse Butte 13-26 CF Stud Horse Hutte 4-28 CF	Stud Horse Butte 11-26 CF	Section 32 Storage Yard (Previously Section 32 Methanol Tunk Storage Facilty)	Stud Horse Butte 4t8-16	Stud Horse Butte 15-27	Stud Horse Butte 11-20 CF	Stud Horse Butte 12-29 CF	Stud Horse Butte 2-33 CF	Stud Horse Butte 10-33 CF	Stud Horse Butte 16-18 CF	Stud Horse Butte 10-35 CF Cabrito 14-25 CF	Stud Horse Butte B1-35 CF
E116 3454	EnCimi	EnCana	PhCana	bucama contact	1000	Entranga Entranga	EnCana	Encana	PaCessa	Entherna	Sen attive	Esstans	ENCARIA	Parlana	ENCHIA	Neck Sami	ENGARA	EnCana	Fro.ana	Etakiama	FIVERIA	Pod ana	FINCARIA	carcons.	Encons	Entana	Encana	EMana	EnCana	Estana	Enclose	EDC-SOL	EIK ana	Entlant	Enc. and	Ent. ana	EnCana	Entana	Entlana	Entires	1	Entant	Euchna	Firensi	Encana		Encana	Engans	ENCHIS Se	Engan	Emrana	Enrada	Encana	Forgus	Enrand	Encina	England	hodama
8820	8776	1111111	8912	8923		5760	6506	9020	9149	9208	4177	9253	9282	9354	9351	9386	9456	9451	9500	9654	5066	8553	9725	10009	10027	10105	10149	10180	10179	10192	10216	10261	10384	10324	10430	10501	10517	10482	10552	10632	10700	10723	10789	10925	91011	11017	11014	11048	11034	31082	11150	11161	11205	11250	11249	11276	11399	11428
12/18/2008	12/17/2008	1/15/2009	1/20/2009	1/26/2009	17272003	2/10/2009	2/20/2009	2/26/2009	3/12/2009	3/24/2009	3/21/2003	4/1/2009	4/13/2009	4/27/2009	4/30/2009	5/7/2009	5/22/2009	5/22/2009	6/2/2009	7/1/2009	9/3/2009	10/10/2008	10/7/2009	10/13/2009	10/14/2009	11/2/2009	11/16/2009	11/25/2009	12/2/2009	12/3/2009	12/10/2009	12/23/2009	2/4/2010	1/21/2010	2/24/2010	2/24/2010	3/17/2010	3/18/2010	4/15/2010	4/20/2010	5/11/2010	5/19/2010	6/1/2010	7/12/2010	7/21/2010	8/3/2010	8/4/2010	8/10/2010	3/11/2010	8/26/2010	9/9/2010	9/20/2010	9/29/2010	10/12/2010	10/14/2010	10/19/2010	11/12/2010	11/15/2010
10/9/2009	10/9/2009	10/9/2009	10/9/2009	16/16/2009	and toy come	10/16/2009	10/16/2009	10/16/2009	10/16/2009	10/16/2009	10/10/2004	10/16/2009	10/23/2009	10/23/2009	10/23/2009	NA 18/23/2000	10/23/2009	10/23/2009	10/23/2009	10/23/2009	10/23/2009	11/6/2009	11/6/2009	V.V.	N.A	NA	12/18/2009 NA	NA	NA NA	1/8/2010	1/19/2010	1/19/2010	NA	472	NA	NA	4/38/2010	NA	NA	V.V.	6/11/2010	N N		7/30/2010	*24	NA.	NA 8/27/2010	NA	VV	NA.	0102/61/11	NA	NA	1/4/2011 NA	Y.Y	1/4/2011	1/7/2011	1/10/2011

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2010 Short Form Short Form 2010 Full Application (new facility)	2010 Full Application (new facility	2010 Short Form	2010 Short Form	2010 Short Form	2010 Short Form	2010 Short Form	2010 Full Application									ZD1D Short Form	2010 Short Form	2010 Short Form	2010 Short Form	2010 Short Form	2010 Short Form	2010 Short Form	2010 Full Application	2010 Short Form	2010 Short Form	2010 Short Form	2010 Short Form		Z010 Short Form	Wind Troug 2010	2010 Short Form	2010 Short Form	2010 Short Form	2010 Short Form	2010 Short Form	2010 Full Application		2010 Short Form	2010 Shart Form	Facility Application	2010 Short Form	2010 Full Application	ZG10 Full Application	2010 Full Application	2010 Short Form	2010 Full Application	2010 Full Application		2010 Short Form	2010 Short Form	Full Application	Full Application	Full Application Full Application	2010 Short Form	2010 Short Form	2010 Full Application	2010 Full Application	2010 Short Farm	2010 Short Form	2010 Short Form	2010 Full Application	2010 Short Form	2010 Short Form	ZD10 Short Form	Full Permit Application	Full Persult Application	2010 Short Form	Z010 Short Form	Full Permit Application	Full Permit Application	Z010 Short Form	ZOTO Short Form	Total Application	2010 Short Kees	Coll Shart Form	2010 Short Farm	2010 Short Farm	2010 Short Porm	2010 Short Form	Full Permit Application	manufactura and a	2010 Short Form	ZD to snort rorm
NA NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	VV	VV	NA	V.V.	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	VV	NA	NA	NA	NA	VV	NA.	NA	NA	NA	NA	NA NA	NA	NA	V.V.	NA	14.17	NA	NA NA
-0.7 0.4 1.3	2.3	6.0	-0.5	-4.0	1.1-	-3.6	0.3	5.2	-0.9	1.7	0.0	6.0	101	2.3	1.9-	8	1.3	-2.1	-2.1	-1.6	-5.1	2.3	1.7	1.2	0.3	-0.6	-0.1	1.0	7.0-	0.3	0.4	0.4	-0.2	-0.9	-0.4	v-		-1.1	0.3	3.7	5.0	2.1	6.3	-0.5	-0.3	-0.2	1.4		-0.6	1.4	970	6.3	0.3	0.3	6.0-	-3.6	10.0-	1.2	0.1	-1,3	14.0	1.1	0.7	17	3.3	0.3	9,0	-0.3	0.2	125	1.0	-0.3	1.1	-0.0	0.3	3.5	0.3	-0.3	-0.2	3.0	677	-6.4	2.6
-10.3 -8.0 6.2	10.8	9.1	-1.7	-22.8	-34.8	-21.8	-123	31.8	-6.2	7.7	-0.3	9.0-	-0.3	2.7.	WIII-	47.4	-5.9	-23.0	-8.6	-4.5	-15.0	10.7	8.6	6.6	-9.4	-2.1	-0.5	-3.4	cii.	50	-11.2	-5.0	-115	-8.1	9.9-	7.5		-13.4	-3.1	7.0	1,47	11.0	25.1	-12.2	9.0-	-16.9	5.7		-0.5	1.1	8.0	5.0	50	-1.5	-6.7	-50.5	-19,4	-5.4	-0.1	-6,8	54.0	8.7	-115	0.1	1.5	9.0	-3.6	-0.8	0.0	8.0	-0.5	-2.7	77	-3.9	L.I.	9.7	4.0	-10.6	-0.6	u	22	-22.0	12.5
-0.7 0.4 1.2	2.1	0.8	-0.5	-4.0	-171	-3.6	0.3	4.7	6.0-	1.5	0.0	0.0	01.	-	177.	7.1	1.2	-2.1	-2.1	-1.6	-5.1	2.1	1.5	1.1	0,3	-0.6	-0.1	1.6	2.0-	0.3	0.4	6.4	-0.2	6.0-	-0.4	1.4		-1.1	0.3	3.2	0.3	1.9	5.7	-0.5	-0,3	-0.2	13		9.0-	1.2	0.5	0.3	0.3	0.2	6.0-	-3.6	-0.8	1,0	0.1	-13	12,7	1.0	9,0	1,0	3.0	0,3	0.5	-0.3	0,2	1.4	1.0	F'0-	1,0	60-	0.3	3.2	0.3	-0.3	-0.2	3.4	977	-6.4	2.4
-10.3 -5.3 4.1	7.2	5.4	-1.7	-22.8	-34.8	-21.8	-123	212	-6.2	5.1	-0.3	-0.6	-0.3	11.0	0117	4774	-5.9	-23.0	9'8"	-4.5	-15.0	7.1	5.7	4.4	-9.4	-2.1	-0.5	-3.4	CIT.	0.3	-11.2	-5.0	-115	-8.1	979-	0.5		-13.4	-3.1	2.2	16.7	7.3	16.7	-12.2	9.0-	-16.9	3.8		-0.5	0.7	0.5	0.3	0.3	-15	-6.3	-58.5	-19.4	-5.4	-0.1	8'9-	36,0	5.8	-11.5	0.1	0.1	6.5	-3.6	B.0-	0.0	0.5	50.5	-7.7	1.4	43.9	0.7	200	6.6	-10.6	90-		3.7	-22.0	8.3
3.7	0.0	3.4	2.6	98	0.0	7.1	0.0	24.8	2.9	0.0	0.0	1.0	4.2	100	6.3	7'7	4.7	4.4	5,0	4.2	6.8	2.8	0.0	1.4	4.4	3.6	0.0	0'0	3.0	777	2.9	3.1	0.0	3.7	4.6	00		4.5	13	5.3	3,4	0.0	0'0	0.0	1.8	0.0	0.0		3.5	1.5	0.0	0.0	00	1.9	4.2	0.0	0.0	4.1	2.8	4.2	1,5	1.4	3.8	1.4	0.0	0.0	4.1	4.6	0.0	0.0	3.3	5.8	0.0	4.6	3.7	1.0	200	2.9	3.6		0.0	6.7	2.4
19.3 18.2 0.0	0.0	9.6	11.0	38.1	0.0	33.5	0.0	15.4	14.2	0.0	0.0	6.3	10.7	22.4	617	11,1	24.5	31.9	19.1	14.3	27.5	678	0.0	3.3	23.9	14.3	0.0	0,0	185	1.3	25.2	16.6	0.0	17.8	18.9	0.0		24.7	9.4	16.9	0.0	0.0	0,0	0.0	5.6	0.0	0.0		11.6	7.6	0.0	0,0	0.0	86	16.4	0.0	0.0	18.5	9.7	15.0	5.6	4.9	27.3	R.0	0.0	0.0	13.1	14.5	0.0	0.0	12.2	17.6	0.0	10.3	12.5	7.3	7.4	20.5	11.6		0.0	20.7	8.1
970 970 970	0.0	0.0	0.0	0.0	4.5	0'0	1.8	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	-	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0,0	2.1	0.0	2.7	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	6'9	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	5.0	0.0
0.0 0.0	0.0	0.0	0.0	0.0	43.2	0.0	22.3	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	9.8	0.0	0.0	0.0	0.0	18.9	0.0	0.0	0.0		0.0	0.0	0.0	95.7	0.0	0.0	17.1	0.0	24.3	0,0	1	0.0	0,0	0.0	0.0	0.0	00	0.0	60.2	23.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0,0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0	0.0	0.0	000	0.0	21.0	0.0
3.0 4.1 1.2	2.1	4.2	2.1	4.6	2.9	3.5	2.1	29.5	2.0	1.5	1.2	1.3	2.0	6.7	7.6	3.4	6.5	2.3	67	2.6	3.8	4.9	1.5	2.5	4.7	3.0	13	2.7	87	67	3.3	3.5	2.8	2.0	4.2	1.4		3.4	1.8	10.5	2.8	1.9	5.7	1.6	1.5	2.5	1,3		2.9	2.7	5.0	0,3	0,2	2.1	3.3	3.3	1.6	5,1	2.9	2,9	14,2	2.4	4.4	2.4	3.0	0,3	4.6	4.3	0.2	1.4	3.4	5.5	1.0	3.7	4.0	1.3	9.1	3.6	2.0	200	2.6	5.3	4.8
9.0 12.9 4.1	7.2	15.0	6.3	15.3	14.3	11.7	10.0	36.6	9,0	5.1	5.6	4.5	9 10	100	10.4	9.9	18.6	8.9	10.5	9.8	12.5	16.0	5.7	7.7	14.5	12.2	4.4	6.4	1.01	7.00	14.0	11.6	7.4	6.0	1221	0.5		113	6.3	22.1	10.0	7.3	16.7	4.9	5.0	7.4	3,8		1111	R.3	0.5	0.3	0,3	7.1	6.5	9.7	4.5	13.1	9.6	8.2	41.6	10.7	15.8	8.1	1.0	0,5	9.5	13.7	0.0	0.5	11.7	14.9	1.4	11.4	13.2	6.2	15.1	10.0	9.9		3,7	19.7	16.4
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